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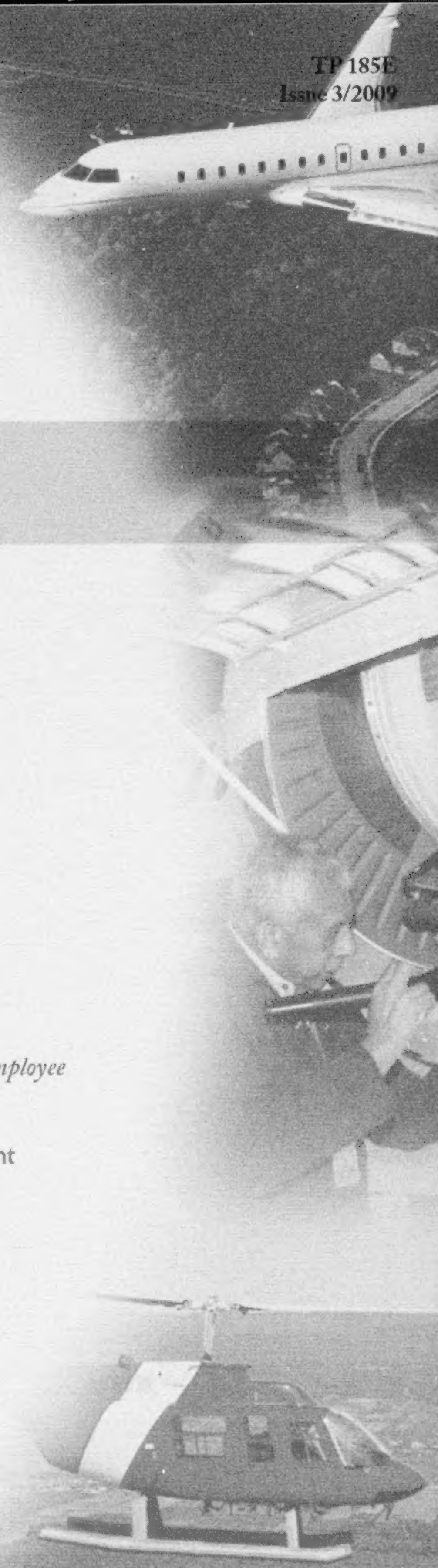

AVIATION SAFETY LETTER

In this Issue...

Learn from the mistakes of others;
you'll not live long enough to make them all yourself ...

TC-1003120

Canada

The *Aviation Safety Letter* is published quarterly by Transport Canada, Civil Aviation. It is distributed to all holders of a valid Canadian pilot licence or permit, to all holders of a valid Canadian aircraft maintenance engineer (AME) licence and to other interested individuals free of charge. The contents do not necessarily reflect official government policy and, unless stated, should not be construed as regulations or directives.

Letters with comments and suggestions are invited. All correspondence should include the author's name, address and telephone number. The editor reserves the right to edit all published articles. The author's name and address will be withheld from publication upon request.

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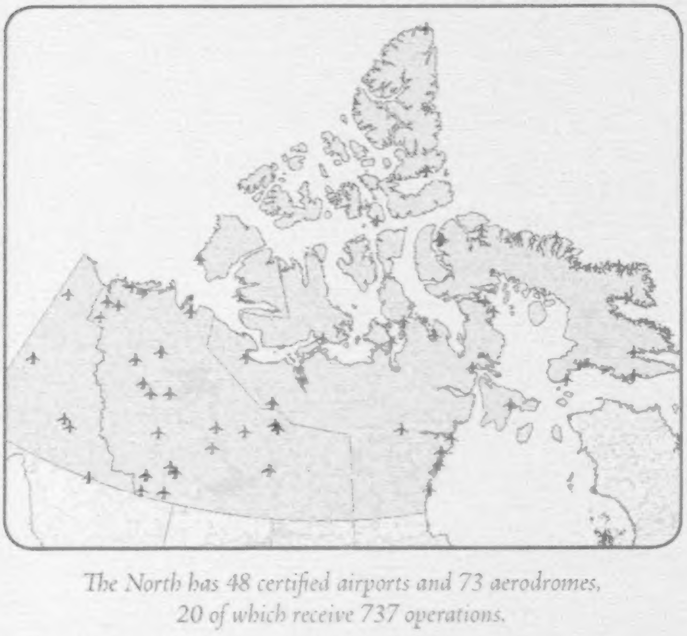
North of Sixty

Every region in Civil Aviation has its own distinctive aviation industry and culture. Prairie and Northern Region (PNR) is no different. Formed by amalgamating the former Western Region and Central Region barely 12 years ago, PNR was primarily created to provide a single point of contact for departmental oversight of transportation in Canada's Prairies and Northern Territories. Since PNR is the only region in Canada to have routine interface with one of the remotest areas of the country, I thought I would take this opportunity to acquaint you with some facts and challenges facing the aviation industry and regulators as we cope with day-to-day activities in a very vast and unique environment.

The Canadian Arctic goes by many names. In Inuktitut, *arctic* means "the place where people find things," and *Nunavut* means "our land." In PNR, we prefer to say "North of Sixty" (N of 60), which refers to the border of the Northern Territories (60^{th} parallel of latitude).

Interest in Canada's Arctic has reached unprecedented levels in recent years. Although the Arctic covers almost 40 percent of Canada's geographic area (3.8 M km²), it is home to a resident population of only 100 000—less than the population of many Canadian cities. Interest in the Arctic stems from economic, cultural, and geopolitical perspectives. It has pristine wilderness, unique archipelagos, a large ecotourism industry, and an enormous burgeoning resource industry. It is hard to imagine that there are four operating diamond mines in the Arctic producing one-third of the world's top gem-quality diamonds and an additional five new mines under construction. Recent estimated oil and gas reserves in the Arctic rival those of the entire Middle East. It is no wonder that Arctic sovereignty, natural-resource exploration and development (gold, diamonds, oil, and gas), and construction of the Mackenzie Oil and Gas Pipeline have dominated our economic and media landscapes in recent years. But how does all of this relate to civil aviation?

Obviously, the economic growth has created a profound dependency on transportation, and aviation is front and centre in the "new" N-of-60 activities. Aviation has always been a way of life for Northerners because even today there are few roads linking communities N of 60; aviation still provides the only source of year-round access for the majority of communities and mine sites. Northerners today travel ten times more by air than the average Canadian. It is no wonder that PNR has seen corresponding explosion in the growth of aviation activity serving the North. There has always been a rich aviation history N of 60, and sagas of legendary bush pilots and aircraft are part of our aviation heritage. However, no longer are the Arctic skies quiet or just home to aircraft like the Beavers, Otters, and DC-3s. Today's northern aviation environment is vibrant, modern, and dynamic. The North has its own air transport association (Northern Air Transport Association—or NATA), 48 certified airports, and 73 aerodromes, 20 of which receive 737 operations. Did you know that there are two international airports N of 60 that receive regular passenger (non-stop direct) flights from Europe? With the new polar routings and the international cold-weather testing facilities in Iqaluit, it is not unusual to see an A380, B777, B767, or B747 gracing the aprons of some northern airports or a Mi-26 Russian helicopter (the world's largest helicopter) transporting or constructing drilling rigs in support of the Mackenzie Pipeline.



The North has 48 certified airports and 73 aerodromes, 20 of which receive 737 operations.

Cold weather testing by airlines and aircraft manufacturers is a traditional aviation activity North of 60.

In six short years, PNR Civil Aviation has grown from six to seventeen 705 operators. All these operators provide north/south services; additionally, three operators provide 100+ passenger-aircraft service to the North (737-200, 300, 700). We have seen significant modernizations of aircraft fleets. Today's Northerner can now receive Learjet medivac services by a local operator based in Cambridge Bay, N.W.T.

The Arctic environment is not a benign environment for aviation: weather, gravel operations, facilities, distances, alternates, etc, etc. It captures all of the future challenges identified in our strategic plan, *Flight 2010* (government agenda, growth, globalization, demographics, and risk management).

N of 60 is Civil Aviation PNR's most unique and exciting frontier, and we are proud to participate in its future and in its aviation systems.

Kate Fletcher
Regional Director, Civil Aviation
Prairie and Northern Region

ACPA APAC

International Winter Operations Conference: Safety is no Secret

AIR SAFETY INVESTIGATORS

The Air Canada Pilots Association (ACPA), in partnership with the Canadian Society of Air Safety Investigators, will host the International Winter Operations Conference: Safety is no Secret on October 7 and 8, 2009, at the Fairmont Royal York Hotel, in Toronto, Ont.

Leading aviation industry experts will explore the latest technologies, operational procedures and lessons learned in the field that can help you tackle the challenges of winter operations. This conference is designed for the entire industry: airlines, corporate and charter operators, military, airport authorities, industry associations and organizations, general aviation, air traffic control, aviation regulatory and investigative authorities, etc. For more information, visit www.winterops.ca.

Awareness of the conditioned response in training

As a designated approved check pilot (DACP) doing check rides for various companies, I see some things that need feedback exposure. Some smaller companies conduct training without the benefit of exchanging methods with others and, without a view from outside, can introduce inappropriate practices. There is no industry forum to advance safety in this regard and in its worst form, this results in the attitude that "we have always done it that way." A fresh viewpoint may point out certain pitfalls not recognized. We become what we train for at times of urgency and should understand that subtle quirks of the training can lead to inappropriate responses.

Typically, I see a general lack of proper response to fire on aircraft (i.e. no sense of urgency to get the aircraft back on the ground). I believe the cause is the method of training. What we do in training is perform the checklist, pretend the event has been brought under control, and then proceed to another exercise. The end result is a repetitive pre-conditioned programming that everything is going to be okay. The threat of death-by-fire is defused.

This attitude is carried forward to the flight test. When I spring a simulated smoke or fire exercise on a candidate, I expect a response that includes an imminent action plan that gets the aircraft stopped on a runway and everyone evacuated. Many of the rejected takeoffs I have seen done have resulted in only the one engine on fire being shut down, sometimes followed by passenger evacuation through a running propeller.

Smoke in the cockpit after departure hopefully initiates a checklist routine, but only at the end of the procedure does the option of returning to the airport come into play, if at all. "Okay, that's done, let's carry on," is the lesson actually learned in the training and carried forward into the flight test. Survival is only a secondary consideration. In view of the incapacitating nature of smoke (eyes, lungs, etc.), the heightened sense of alarm, passengers panicking and the unknown factor of whether the fire is actually out, surely the first item should be to start on a plan to land as soon as possible? Nowhere is this perhaps exemplified more thoroughly than in the Swissair disaster off Nova Scotia. The crew, apparently, were more concerned with landing the aircraft above its approved landing weight than evacuating. Could their repetitive training have given them the false sense of security that the problem would pass? I believe at some point they had reason to think the fire was out. But fire is a pervasive, persistent chemical reaction. It is not out until a suitably long time lapse has proven it to be the case. That time lapse is better spent outside the aircraft, on the ground.

And what of the unfortunate crew of the Navajo in 2005 who had only 30 s between fire recognition and disintegration? (Transportation Safety Board of Canada [TSB] Report A05P0080) In its report, the TSB recommended the following: "*...it is important that the crew members accomplish the critical action checklist immediately...and to land as soon as possible.*"

Recently, an engine fire was simulated while holding at 10 000 ft (6 500 ft above ground level [AGL]), after ATC cleared the approach. The aircraft remained level while the fire checklist was completed. (Interestingly, ATC subsequently questioned the delay in descending.) Further prompting that the "passengers are complaining about smoke and flame" resulted in a 1 500 ft/min descent and full non-directional beacon (NDB) approach, which meant 9 min 10 s had passed after the passengers' complaints of fire before the aircraft was stopped on the runway. Total fire-event time was in excess of 12 min. Similarly, another captain candidate, too nonchalant about coping with an engine fire, was given the "passengers reporting flames" prompt. He turned to the safety pilot and said, "Is he trying to tell me something?" The response was, "I think he means hurry it up already!" I thought this dialogue distinctly showed the captain was not into the exercise, although he expedited most of the rest of the approach. Still, many valuable minutes were wasted while his aircraft was in a dubious state of airworthiness.

Another pilot, cruising with one engine simulated shut down, quickly shut down the remaining engine when its reliability was called into question. It was a knee-jerk training response. How will these (good) pilots actually respond in a real emergency? In view of their training, we hope, successfully. However, it would be human nature to resist drawing attention by requesting (demanding) a priority approach. Turning back after departure is like a sense of failure. Coupled with the conditioning of training that the fire always goes out, the priority of evacuation may be low on the list. A British 737 burned up because the crew chose to taxi off the runway with disastrous results due to the time delay.

Nowhere in these examples was any consideration given to the damage done while the fire was active. Is the wing going to detach? Since it is not an "engine" fire (misnomer!), but actually a "nacelle" fire, what fuel, hydraulic, electrical and other lines have been destroyed?

Is the fire actually out, or is it still consuming vital components? Will the landing gear extend...and if it does, will the tires or the brakes still be there or will they fail on touchdown? Is there a need to land gear up? How long does it take to burn through thin aluminium? Just how much time will elapse before I can evacuate this aircraft? One candidate did not favour diving the aircraft if it was on fire because his instructor had warned (trained) him of the blowtorch effect. I explained the fire triangle to him.

Training gives us conditioned and mechanical responses to situations we may face. In real-life situations, it can be very revealing to see what we have actually trained ourselves to do. Military psychiatrist, Lt-Col. David Grossman, in his book *On Combat,* tells of a policeman who trained himself to become very adept at snatching a pistol from a person's hand. He practiced repetitively snatching the weapon, handing it back, snatching the weapon, handing it back, etc. Eventually, one day, he actually snatched a pistol from the hand of a real perpetrator...and promptly handed it back to him. He was only saved by the frozen astonishment of his opponent.

So, we have to be careful just what we are training ourselves to do. What is the actual conditioned response we have filed in our brains? Sometimes it can be surprising...maybe deadly.

I would recommend that a fire drill conducted in training be followed by an expedited landing at the nearest airport, with a view to evacuation. That would hopefully glue the correct and timely response in trainees' minds, while instilling the sense of controlled urgency that must be demonstrated in coping with any life threat. While none of the above is meant to foster an unreasoned and rash response to a fire, remember:
TIME x FIRE = THREAT TO LIFE.

John Warner
Calgary, Alta.

The Power of Flight: 100 Years of Connecting Canadians and the World

In February, the Honourable John Baird, Minister of Transport, Infrastructure and Communities, declared February 23 as National Aviation Day, so that each year Canadians can celebrate past achievements and open new chapters in aviation excellence.

There was a time when connecting citizens meant meeting in the village square to exchange news and debate issues. As society became more complex, and because of great distances separating people, visionaries looked for new ways to bring people together.

February 23, 2009, marked the 100th anniversary of connecting communities from coast to coast to coast of our vast country through powered flight. Very few nations in the world owe more to flight than Canada. Aviation opened up the country and remains a lifeline to many remote and northern areas.

From the 1909 Silver Dart to Bombardier's 2008 launch of its "green" fuel-efficient jets, Canada has much to celebrate. National Aviation Day is meant to honour the pioneers who opened the skies as a way to connect people and move goods safely and quickly—within our large nation and around the world. It also allows Canada to celebrate the aircraft engineers and operators, air force personnel and veterans, airport planners and air traffic controllers, lawmakers and safety and security experts who share the credit for Canada's aviation strength and success at home and abroad.

Canadians are celebrating the 100th anniversary of the first powered flight in Canada. For more information, please visit www.canadiancentennialofflight.ca.

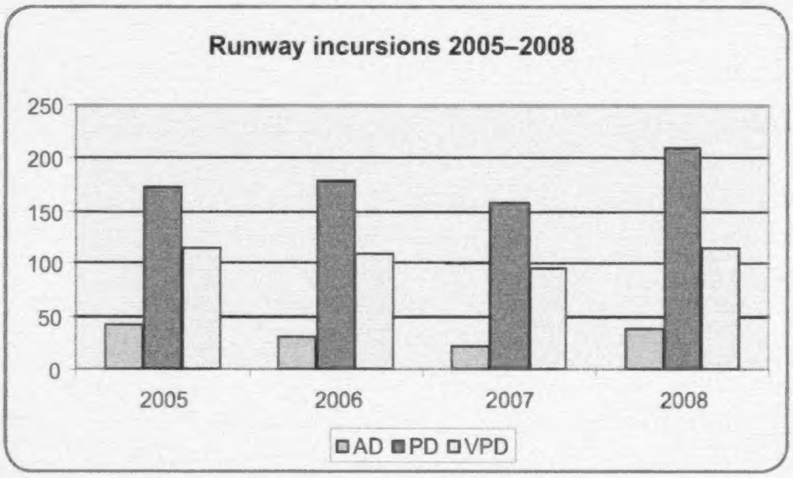
2009 Update on Runway Safety

by Ann Lindeis, Manager Safety Management Planning and Analysis, NAV CANADA

NAV CANADA

How frequent are runway incursions?
The chart below indicates the number of runway incursions from 2005–2008. These runway incursions include:

- **Air traffic services deviations (AD)**: situations that occur where air traffic services (ATS) are being provided, and where a preliminary investigation indicates that safety may have been jeopardized, less than minimum separation may have existed, or both.
- **Pilot deviations (PD)**: situations that occur where the actions of a pilot result in non-compliance with an ATC instruction/clearance, or a violation of the *Canadian Aviation Regulations* (CARs).
- **Vehicle or pedestrian deviations (VPD)**: situations that occur where a vehicle operator, a non-pilot operator of an aircraft, or a pedestrian proceeds without authorization onto the protected area of a surface designated for landing or taking off.



While most of these events had little or no potential for a collision, it should be noted that runway incursions continue to happen and we need to maintain our efforts to reduce the incidence.

Why do runway incursions happen?
A wide range of factors contribute to runway incursions, including less-than-perfect aerodrome design, technology, procedures, training, regulations and human error. Progress in managing runway safety requires on-going effort from everyone in the aviation industry.

What activities are being undertaken to manage runway safety?
Runway safety is a collective responsibility. This responsibility extends to organizations (aerodrome operators, the air navigation service provider, and the air operator) as well as to individuals (e.g. controller, pilot, vehicle operator). This article will highlight some of the recent initiatives for enhancing runway safety involving NAV CANADA at the local, national and international levels.

Communication

- As part of the continuing effort by NAV CANADA to respond to customer needs and conform to international best practices, procedures were implemented to replace the English phraseology of "taxi to position" and "taxi to position and wait" with the International Civil Aviation Organization (ICAO) standard phraseology "line up" and "line up and wait" when instructing aircraft to enter the departure runway. The change was implemented April 10, 2008, and the *Transport Canada Aeronautical Information Manual* (TC AIM) has been amended. A major dissemination project was undertaken involving the Air Transportation Association of Canada (ATAC), Air Line Pilots Association (ALPA), Canadian Business Aviation Association (CBAA), Canadian Owners and Pilots Association (COPA) and their U.S. affiliates. NAV CANADA unit managers also briefed local flight schools and customers. No changes have been made to the French phraseology.

- To emphasize the protection of active runways, and to enhance the prevention of runway incursions, pilots are asked to acknowledge taxi authorizations that contain the instructions "hold" or "hold short" by providing a complete readback

or repeating the hold point. With the increased simultaneous use of more than one runway, instructions to enter, cross, backtrack or line up on any runway should also be acknowledged by a readback.

- NAV CANADA formed a Working Group with customers and stakeholders to address ATS-pilot communications. The mandate of the Working Group is to enhance safety by undertaking initiatives to improve communication and reduce communication error. The group has initiated an awareness campaign aimed at ATS personnel as well as pilots. The campaign involves an educational DVD on ATS-pilot communications, posters, and articles.

Procedures

- Procedures were changed to have controllers instruct an aircraft to either "cross" or "hold short" of any runway it will cross while taxiing. Therefore, **unless you are specifically instructed to line-up, proceed/taxi on, or cross a runway, hold short of that runway**.

Charts

- On October 25, 2007, NAV CANADA began depicting "hot spots" on aerodrome charts or applicable aerodrome ground movement charts in the *Canada Air Pilot* (CAP). ICAO defines a hot spot as a location on an aerodrome movement area with a heightened risk of collisions or runway incursions, or a history of both, in which greater attention by pilots is necessary. Some pilots include these hot spots in their pre-departure or arrival briefings. Airport charts are available at: www.navcanada.ca/NavCanada.asp?Language=EN&Content=ContentDefinitionFiles%5CPublications%5CAeronauticalInfoProducts%5CCharts%5Cdefault.xml.

Technology

- Airport surface detection equipment (ASDE) has been installed at more airports, enabling controllers to detect potential runway conflicts by providing the controller with a radar picture of movement on runways and taxiways.

- Expanded dynamic use of stop bars at Toronto/Lester B. Pearson International Airport. Although primarily used during low-visibility operations, pilots may also encounter illuminated stop bars under other operational conditions on the high-speed exits leading from Runway 06R/24L and approaching Runway 06L/24R. **Pilots should never cross an illuminated stop bar**.

- NAV CANADA and the Aéroports de Montréal (ADM) are jointly investing in a new multilateration surface surveillance system that will improve aircraft and vehicle visibility on the runways and the airport apron at Montréal/Pierre Elliott Trudeau International Airport. The technology is called multistatic dependent surveillance (MDS).

Sharing runway safety information

- Local runway safety teams or committees are active at many sites across Canada. The composition of these committees varies, but typically includes representation from the aerodrome operator and the local NAV CANADA unit, as well as air operators.

- RSIPP: In 2005, NAV CANADA invited stakeholders to form an independent Working Group to exchange safety-related information pertaining to the movement of aircraft and vehicles on the manoeuvring areas, with the aim of promoting runway safety and with a primary focus on the reduction in the risk of runway incursions. The group is called the Runway Safety and Incursion Prevention Panel (RSIPP). Membership in RSIPP includes representatives from various aviation stakeholders, including Canadian Airports Council (CAC), COPA, ALPA, Air Canada Pilots Association (ACPA), Canadian Air Traffic Control Association (CATCA), Air Traffic Specialists Association of Canada (ATSAC), ATAC, CBAA and observers from Transport Canada and the Transportation Safety Board of Canada (TSB). The focus this year is on establishing connections with local runway safety activities, and developing tools to support local and national runway safety knowledge and activities.

- At the international level, ICAO published the *Manual for the Prevention of Runway Incursions* (Doc 9870). The manual can be found on the ICAO Web site: www.icao.int/fsix/_Library%5CRunway%20Incursion%20Manual-final_full_fsix.pdf.

These are just a few of the activities being undertaken within the aviation community in Canada.

For information about other runway safety initiatives, see the following links:

- Transport Canada: www.tc.gc.ca/civilaviation/systemsafety/Posters/tools.htm
- Eurocontrol: www.eurocontrol.int/airports/public/standard_page/APR1_Projects_RWY.html
- Federal Aviation Administration (FAA): www.faa.gov/airports_airtraffic/airports/runway_safety/
- Aircraft Owners and Pilots Association (AOPA): https://www.aopa.org/asf/osc/loginform.cfm?course=runwaysafety&project_code=&
- Flight Safety Foundation (FSF): www.flightsafety.org/runway_initiative.html △

The SAC Column: Transition to Motor Gliders

by Dan Cook, Soaring Association of Canada (SAC)

Motor gliders (MG) were discussed at a recent meeting of the Soaring Association of Canada's (SAC), Flight Training and Safety Committee (FTSC). MGs can be grouped into categories based on their capabilities, as follows:

- Self-launch MGs, which use the engine as a launch method. The motor will be shut off once normal gliding altitude has been reached and the MG is then used as a pure glider;
- Sustainer MGs, which use the engine for cross-country assist. The MG will be launched and flown as a glider, but the motor will be used to prevent an out landing, or to fly the glider back to base under power in the event lift vanishes. Cross-country distances would likely see diamond distance attempts with potential returns approaching 250 km;
- Touring motor gliders (TMG), which can be used as self-launching gliders or light aeroplanes, and are able to reach remote landing sites at up to 1 000 NM ranges.

More of these gliders are appearing on the Canadian scene as they are gaining popularity. Pilots progressing to MGs should obtain a thorough dual checkout in a similar glider before attempting solo flight. Pilots have had difficulty with these glider types, and the procedures in this article should normally be performed in a two-seat MG, but if none is available they should be performed solo.

Many of the older models have complicated starting procedures and can distract the pilot from the task of safely flying the MG. In addition, most of these MGs have poor performance when the engine is deployed but not operating. Therefore, a series of flights and exercises have been devised to assist pilots to safely convert to their MG. The pilot must become familiar with handling the aircraft under these emergency conditions before attempting a solo flight with the engine on. The initial airfield selected for this training should have a fairly long runway (4 000 to 5 000 ft) and have many off-field landing options close by. Learning on too short a runway will be difficult.

Experiences with transitioning pilots to TMGs show the average power pilot can require up to 5 hr on type to be cleared for solo, and the average glider pilot can require 10 to 12 hr. These flights are mostly touch-and-go, except for approximately one hour cross-country flying. This translates into about 25 takeoffs and landings for the power pilot, and approximately 65 for the glider pilot. Experienced pilots may require fewer hours; the check instructor can give guidance.

Pilots flying TMGs cross-country may have to deal with more complicated issues related to airspace, radio procedures, controlled airports, and ATC procedures. This will require more elaborate flight planning and navigation skills.

The SAC prepared the following general guidelines for pilots transitioning to a sustainer, self-launching or other MG. Note that these guidelines do not constitute or replace formal training. The SAC hopes these guidelines will assist pilots who convert to engine takeoffs and emergency landings when first flying their new MG, and cover the additional skills needed for cross-country flying.

General guidelines

- Before using the engine for the first time in either the sustainer or self-launching glider, the pilot should become thoroughly competent at flying the glider without using the motor. This will require a number of soaring flights, launching by aerotow, during which the characteristics of the glider can be explored and mastered.

- Take-off performance in a self-launching glider can be greatly affected by weight, slope of the runway, length/wetness of the grass, hard runway surface, wheel brake, density altitude, bugs on wings, etc. Before takeoff under the glider's own power, a physical landmark for a lift-off decision

point must be selected to allow a safe abort. If not airborne by this point, the takeoff must be aborted.

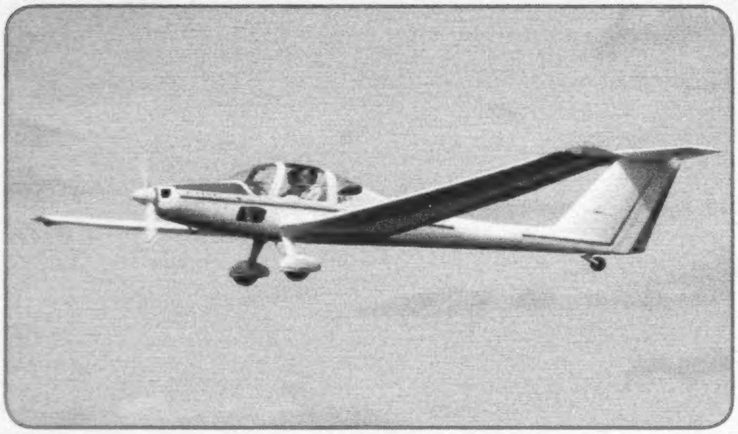
- Never attempt to deploy the engine and start it in the circuit. It is recommended that when planning to deploy and start the engine, you circle over your selected landing field. Climb away while circling over the field until certain the engine is performing well.

- Do not deploy the engine in flight unless you have picked out a field that you can reach and land in with the engine deployed but not operating. Should the engine not start, you will need the field in short order.

- If the engine is deployed and does not start by 800 ft above ground level (AGL), do not continue to attempt a start or try to store the engine, unless this is an automatic (one-button) action. Shift your concentration to completing an abbreviated circuit and landing with the engine deployed. The downwind, diagonal and base legs will have to be much closer to the intended landing area than normal.

- Glider pilots who intend to fly a TMG should receive additional ground school training, emphasizing the points above, and make use of the recreational pilot permit curriculum as the standard. In addition, potential TMG pilots could attend a powered flight ground school to fill in the voids in the glider ground school training.

- A SAC bronze badge is the minimum requirement for a glider cross-country flight.



Grob 109 TMG (Photo: Wikipedia)

Glider pilots who wish to fly a TMG without a private pilot licence (PPL) or recreational pilot permit (RPP), or cross-country training and experience should complete:

- checkouts on type, including a sufficient number of dual flights to demonstrate normal and emergency handling of the aircraft under power and as a glider; and
- dual cross-country practice in a TMG in powered flight in excess of 50 km, including flight planning, navigation, diversion skills and a remote airport landing.

Since the Flight Crew Licensing Standards in the *Canadian Aviation Regulations* (CARs) define glider to include MGs, the pilot of a glider or MG requires a glider pilot licence and an endorsement by a glider instructor (themselves qualified on the launch method) on each launch method the glider pilot intends to use. For more definitive information about the licensing requirements for pilots of these gliders, contact the FTSC, at sac@sac.ca. △

BLACKFLY AIR

COPA Corner: Weight and Balance

by John Quarterman, Manager, Member Assistance and Programs, Canadian Owners and Pilots Association (COPA)

For most of us in the mid-fifties crowd—the majority and average age of COPA members—we learned to fly quite some time ago. In fact, many of us learned to fly in the seventies and early eighties. This is also true for most recreational pilots in Canada. Now it's a delicate subject to be sure, but the truth is that back then we were quite a bit younger and slimmer. And judging by the snapshots that many of us like to show off of our younger days when we were flying and travelling over North America, we can see that our personal weights have increased steadily over the years since our early flying days.

Of course, that's not the only trend we see. People have been eating more and gaining mass and stature. Today, people weigh more at any given age than they did a few decades ago.

Transport Canada recognized the trend in personal mass in response to the Transportation Safety Board (TSB) recommendations following the crash of Georgian Express Flight 126 on January 17, 2004, and other crashes preceding it. And so, on January 20, 2005, Transport Canada updated section RAC 3.5 of the *Transport Canada Aeronautical Information Manual* (TC AIM) (then known as the *Aeronautical Information Publication*—or *A.I.P. Canada*) with new male and female standard weights, including both summer and winter weights. To understand the specific reasons for the changes and the TSB recommendations which in part prompted them, *A04H000—Interim Aviation Safety Recommendations: Standard Passenger Weights—Use and Validity of Standard Values* is good reading. (The document is available at www.tc.gc.ca/tcss/TSB-SS/Air/2004/A04H0001/A04H0001_p2.htm). One passage in this document provides an analysis of the passenger weight on Georgian Express Flight 126:

> The average weight of the passengers on Georgian Express Flight 126 using standard weights was 183.3 lbs (9 men at 188 lbs, 1 woman at 141 lbs). Using actual weights, the average passenger weight was 240 lbs. This represents an increase of 56.7 lbs per passenger from the published standard weights. This is a biased sample, but nonetheless indicates the increased weight of the Canadian population.

The difference between our modern weights and those of a few decades back is quite startling as illustrated by the chart below (extracted from a Statistics Canada article on Canadian weight studies).

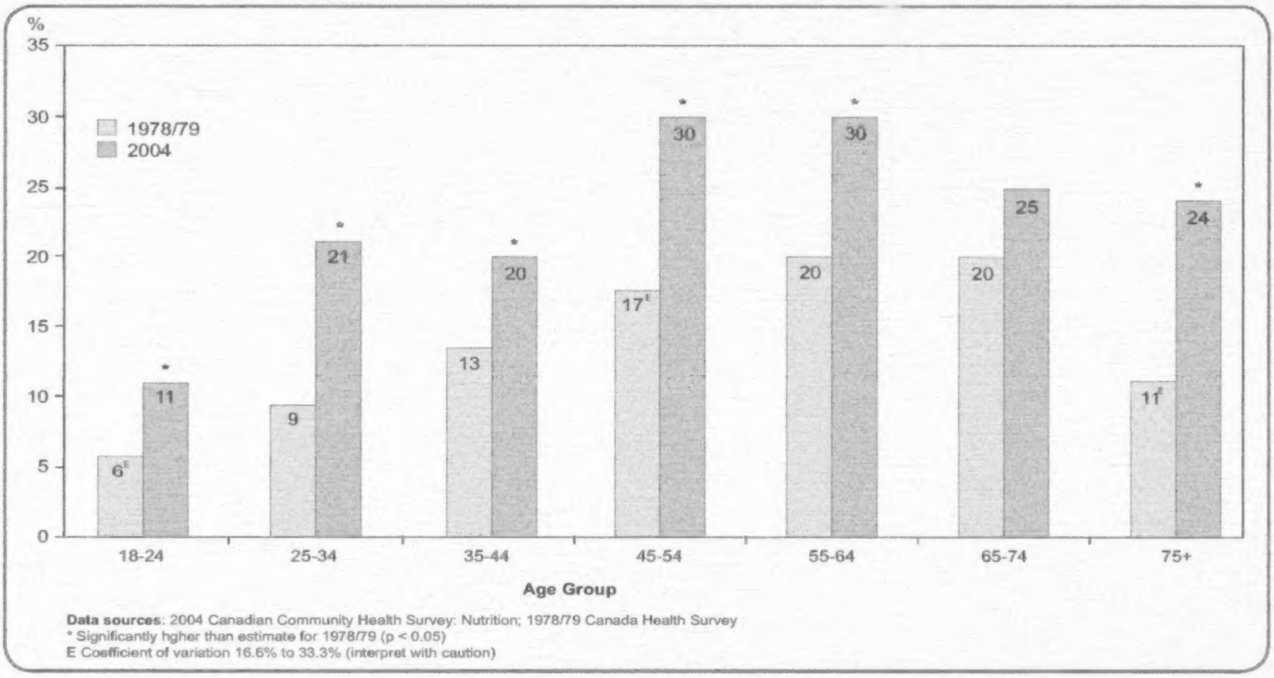


Chart 1: Obesity rates, by age group, household population aged 18 or older, Canada excluding territories, 1978/79 and 2004
(*Source: Adult obesity in Canada: Measured height and weight* www.statcan.ca/english/research/82-620-MIE/2005001/articles/adults/aobesity.htm)

Pre-flight

Of course, many of us fly aircraft that were designed in the sixties, produced in the seventies, and equipped with four seats. It is instructive to realize that these four-place aircraft, such as the popular Cherokee 140, Cessna 172, American AA-5 Traveller, and Beechcraft BE-19 Sport, were actually built based on the concept that the aircraft could transport two male-female couples or even four males safely with proper fuel-load management and still carry adequate reserves for cross-country flights. Of course, using today's standard weights, this is no longer feasible. However, that doesn't stop some people from trying. A chief flight instructor (CFI) at a local flight school confided to me that on a number of occasions he has reminded rental pilots before flight that their intended weight load would clearly put the aircraft hundreds of pounds over gross and that he has refused to sign the pilots out as a result.

Even modern versions of these aircraft suffer from this weight trend. Exacerbating the problem is the fact that many of these aircraft designs have been steadily modernized over the years with sound insulation, additional avionics, modern metal instrument panels, autopilots, 26 g seats, beefed-up doors and wheel pants, and in some cases, oxygen and a turbocharger. All these modifications, while highly desirable in themselves, have added weight to the aircraft designs so that in combination with higher personal weights the aircraft are really only four-place aircraft in name only. In some of these aircraft, the complication of a different landing weight—as compared to the take-off weight—has been introduced because the gross weight has been raised to compensate, but the landing weight has not. In other aircraft, the gross weight has been raised slightly, but the overall useful load has declined.

Standard passenger weights—Use and validity of standard values

So what can we do about this? Well, in the first place—and more than ever—we should be doing our sums and calculations before we launch. That means doing a full weight and balance using actual weights in accordance with TC AIM RAC 3.5.1 as part of the pre-flight planning. It is tempting and convenient to assume that this calculation is not necessary with only two people. In fact, it can easily be shown that in many aircraft two large adults and a full extended-range-tanks fuel load exceeds both the balance and the weight limits. Therefore doing the calculations is a must, since flying overweight is illegal.

Canadian Aviation Regulation (CAR) 602.07 states in part:

> *602.07 No person shall operate an aircraft unless it is operated in accordance with the operating limitations*… (underlining by author)

CAR 704.32 states in part:

> *704.32 (1) No person shall operate an aircraft unless, during every phase of the flight, the load restrictions, weight and centre of gravity of the aircraft conform to the limitations specified in the aircraft flight manual.*

TC AIM RAC 3.5 states:

> The CARs require that aircraft be operated within the weight and balance limitations specified by the manufacturer. Actual passenger weights should be used, but where these are not available, the following average passenger weights, which include clothing and carry-on baggage, may be used.

NOTE: These average weights are derived from a Statistics Canada Survey, Canadian Community Health Survey Cycle 2.1, 2003.

Summer		Winter
200 lbs or 90.7 kg	MALES (12 yrs up)	206 lbs or 93.4 kg
165 lbs or 74.8 kg	FEMALES (12 yrs up)	171 lbs or 77.5 kg
75 lbs or 34 kg	CHILDREN (2-11 yrs)	75 lbs or 34 kg
30 lbs or 13.6 kg	*INFANTS (0 to less than 2 yrs)	30 lbs or 13.6 kg

* Add where infants exceed 10 percent of Adults

On the positive side of this issue, times have changed, and technology has marched on to provide us with all sorts of new solutions. While we have yet to invent the general aviation-friendly, human-weight-shrinking machine that most of us would like, we do instead have a ready assortment of flight planning and computer calculation mechanisms to choose from to manage our weight and balance calculations.

In our long-ago days of flight training, we learned to do these calculations by hand from the aircraft flight manual. The calculations are simple to do, but they take a little time to be accurate and require a weight and balance form, plus either a calculator or hand calculation, and a weight and balance graph on which the aircraft weight and balance is plotted.

COPA has evaluated several modern flight-planning packages while aviating about the country, and all of them offer excellent facilities for turning out accurate weight

and balance forms in a snap. Some of these programs are quite inexpensive. Computer spreadsheet programs may also be used; one COPA member, for example, uses one of these spreadsheet programs to create weight forms and plotted weight and balance graphs almost instantly for all of the several aircraft types he flies. To help pilots work their way through the maze of personal computer products available, COPA has a dedicated column in its monthly *COPA Flight* newspaper that regularly reviews these types of products.

So what's the bottom line? Do those weight and balance calculations. If you need to arrange a painless computer program to do them, by all means do so. It could save you embarrassment or worse. In today's world, it's a snap to do these calculations, and there is no excuse for not carrying them out. For more information on COPA, visit www.copanational.org. △

The HAC Column: NTSB HEMS Hearings

by Fred L. Jones, President and CEO, Helicopter Association of Canada (HAC)

Has anyone else been watching the Helicopter Emergency Medical Service (HEMS) hearings from the U.S. National Transportation Safety Board (NTSB)? I must confess to having become somewhat addicted to the NTSB webcast on this subject from February 3 to 6, 2009 (www.ntsb.gov/events/Hearing-HEMS/default.htm). I believe that it should be required viewing, particularly for those working in the Canadian HEMS community. I found the whole thing captivating—starting with this excerpt from the Chairman's introductory remarks:

"In the last six years, we have seen 85 HEMS accidents, resulting in 77 fatalities. In the calendar year 2003, we saw 19 accidents and 7 fatalities; in 2004, there were 13 accidents with 18 fatalities; 2005 had 15 accidents and 11 fatalities. In 2006, 13 HEMS accidents occurred with a total of 5 fatalities. In 2007, there were 11 accidents with a total of 7 fatalities. However, 2008 was the deadliest year in HEMS on record, with 13 EMS helicopter accidents, and 29 fatalities."

If that doesn't grab your attention, I don't know what would. For me, the evidence at the hearing, and my observations since then, have served to highlight some of the significant differences between American and Canadian HEMS operations, including our safety culture, the size of the HEMS community, our funding models, and our regulatory and medical care infrastructure, to name only a few—all of which influence the safety of flight operations.

Now, admittedly, all these differences make it more difficult to compare apples to apples, and this is a very complicated dynamic, but we can still learn a lot from one another. Apparently the NTSB thinks so too, since they invited Sylvain Séguin of Canadian Helicopters to testify on the first day of their hearings. Dedicated HEMS operators in Canada haven't had a fatal accident since the inception of the first dedicated service, which dates back to 1977. That's 230 000 flight hours and an accident record we should be proud of—one that we should work hard to maintain.

HAC

Just to put the issue into perspective, in a fiercely competitive environment, the number of American dedicated HEMS aircraft has roughly doubled every 10 years, to now include approximately 638 dedicated helicopters, by comparison with Canada's 20 dedicated machines that operate under largely revenue-hour neutral contracts based on larger monthly fees and smaller hourly rates.

The Canadian aircraft are all multi-engine IFR helicopters, with two IFR-trained crews. By comparison, American HEMS operators can operate single-pilot, single-engine night VFR.

Our night VFR operations are limited to the applicable night VFR minimum obstacle clearance altitude (MOCA), to avoid drift down in adverse weather, with an IFR option if turning around becomes problematic. American HEMS operators have no similar MOCA limitation at night, and fewer options when turning around is not an attractive alternative to pressing on and flying lower.

Drawing any conclusions from these differences is difficult, but I encourage *Aviation Safety Letter* (ASL) readers to form their own opinion based on a review of the evidence, an assessment of the differences, and even perhaps based on their own HEMS experience. HAC naturally would like to see HEMS expand into Canada, but we should always be open to learn from our own experiences and benefit from the experiences of others. △

Missed Engine Cover Still Installed Brings Down Helo

On August 6, 2008, an MD 369D helicopter was operating near Alice Arm, B.C. The helicopter took off at about 07:09 Pacific Daylight Time (PDT) for the first flight of the day, with one pilot and three passengers; it was headed to a drill site up the Kitsault River valley. As the helicopter departed in a shallow left climbing turn, it emitted an unusual sound, reached about 150 ft above ground level (AGL), then suddenly banked 90° to the right and fell to the ground. It broke up on impact and all four occupants suffered fatal injuries. The investigation by the Transportation Safety Board of Canada (TSB) is complete, and the following is based on TSB Final Report A08P0244.

Other factual information

The pilot had 38 years of flying experience and had accumulated over 11 000 hr of flight time. The work schedule was relatively light. Prior to this tour of duty, the pilot had been off for 10 days. This was well within the limits of duty time, and he had a quiet, restful evening before the accident flight.

There was an apprentice aircraft maintenance engineer (AME) on site to help with elementary tasks on the helicopter. He would normally look over the helicopter at the end of the day and secure it for the night. This included installing a synthetic heavy material cover (doghouse cover) over the engine intake and around the main rotor control system, and tying down the main rotor. He would normally get up in the morning to remove the cover and untie the rotor, among other things. A couple of days before the accident, the pilot suggested that the apprentice need not get up early, and that he would prepare the helicopter for the day's flying. On the last two nights, the apprentice did not tie the rotor down, but he did install the cover.

The cover did not have any straps or physical barriers that fall at or below human eye level. Once the pilot gets into the helicopter, there are no visual clues of the cover's installation. Before this occurrence, it was expected that the engine would not start with the cover installed, but we now know that as soon as the rotor started turning, the cover opened enough to let in sufficient air for the start.

On the morning of the accident, the pilot was up at the usual time, but stayed at the lodge a little longer and arrived at the helipad later than normal. Two of his passengers arrived before him that day. When the third passenger arrived at the helipad, the pilot was loading the other passengers' equipment. They loaded some more equipment, embarked the helicopter and departed immediately after. Examination of the helicopter wreckage at the accident site revealed the cover tightly wrapped around the main rotor control system, around the swashplate (see Photo 2). Nearly all the control linkages (pitch change rods) were broken and the damage was not consistent with that normally found from crash impact forces. Rotor blade damage was consistent with low rpm at impact. Tree damage and scars at the accident site were consistent with a vertical descent, and no rotor rpm.

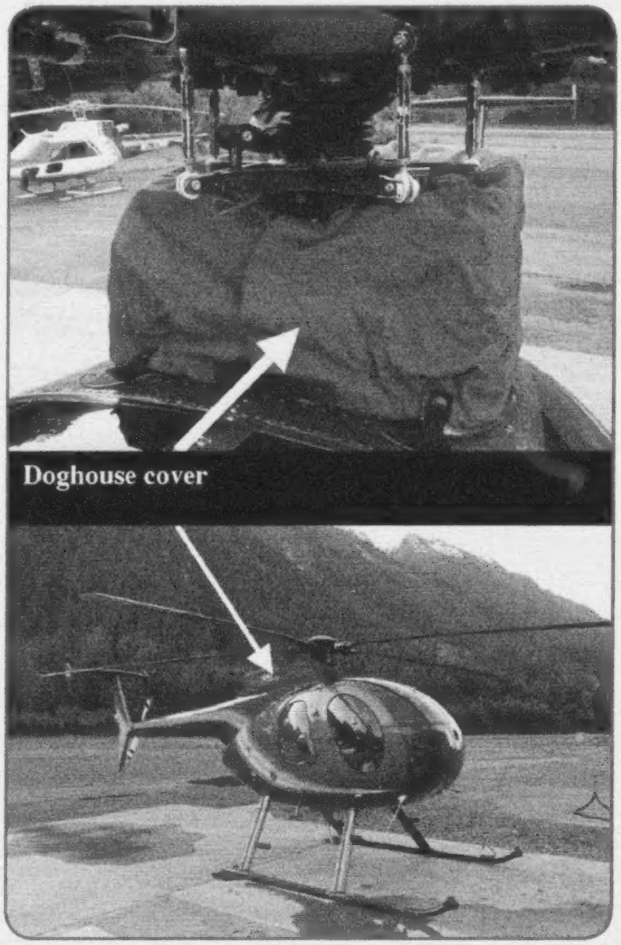


Photo 1: Doghouse cover

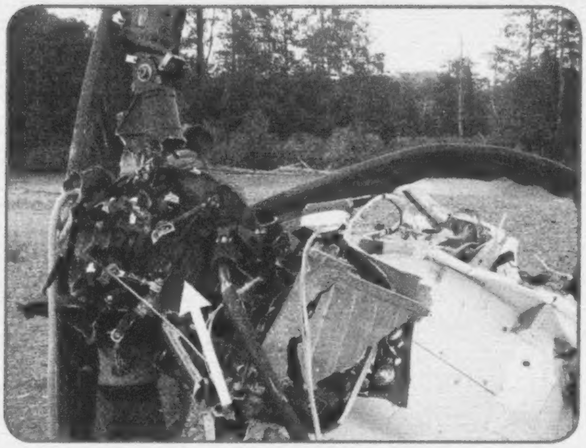


Photo 2: Doghouse cover wrapped between controls

Photo 3: Modified doghouse cover

Analysis
It is clear that the removal of the cover was missed during flight preparation and that the cover damaged the main rotor controls while the rotor was turning. Also, rotor rpm was likely lost due to the binding effect that the cover had as it squeezed between the stationary and rotating components of the swashplate assembly. This rendered the helicopter uncontrollable after the takeoff, and it collided with terrain.

To determine how this item could be missed, the following analysis focuses on human factors.

Because humans are easily distracted and our memories are less than perfect, we use training, routine, checklists, visual cues, and physical defence barriers to help us carry out required tasks.

There were no physical barriers to prevent the pilot from operating the helicopter with the cover installed. When the cover was installed without the main rotor being tied down, two things happened. The physical barrier and visual cues were removed. Since the pilot arrived at the helipad after some of his passengers, it is possible he was distracted from his normal routine by the need to assist them loading their equipment. Also, mental imprinting of the task to remove the cover could have been lessened by the practice of having someone else install it.

In summary, anomalies in the pilot's routine and the lack of physical barriers likely caused him to miss removing the cover before the flight.

The TSB final report lists the following three findings as to causes and contributing factors:

1. The doghouse cover was not removed before flight and it wrapped around the flight controls linkage, damaged the linkage, and rendered the helicopter uncontrollable.
2. The helicopter fell in an uncontrolled state, with reduced rotor rpm, until it collided with terrain.
3. Anomalies in the pilot's routine and the lack of physical barriers likely caused him to miss removing the cover before the flight.

Safety action taken
As a results of this occurrence, the operator implemented procedures requiring that blade tie-downs be installed whenever the doghouse cover is installed. Also, the covers have been modified with tape/straps that hang down and are to be placed in the front doors.

The manufacturer of the doghouse (Aerospace Filtration Systems Inc.) has taken safety action in modifying the cover (see Photo 3).

Closing comment from the lead investigator to the Aviation Safety Letter *(ASL): "I would hope that the ASL readers don't think this was just a stupid error. This cover was missed by a very well-respected and careful pilot. If it happened to him, it can happen to any of us. It is also important for all operators to get that message. Our analysis looked at human factors to determine how a fastidious, experienced pilot could miss such a basic and critical item."* △

Night Vision Goggles Blind to LED Lights

by Stéphane Demers, Civil Aviation Safety Inspector, Rotorcraft Standards, Standards, Civil Aviation, Transport Canada

Aviation eats up technology at an ever-increasing speed. Today, we see numerous technological advances being adapted from the military and from other areas into a broad spectrum of aviation-related applications.

Night vision goggle (NVG) technology is becoming mainstream, especially in the rotorcraft community. The ability to have a discernable horizon, see terrain details that were previously masked by darkness, and greatly increase night-operation safety makes the decision to use NVGs a wise choice. Pilots who use NVGs regularly now consider unaided night operations more of an emergency measure and would reluctantly fly without them.

Light emitting diode (LED) lights are another great tool, and their use is fast becoming the norm. In the past two to three years, these little lights have made their way into all forms of lighting fixtures, from tiny flashlights to automotive lights. In aviation, LED lights are now being used for obstruction and aircraft lighting. LED bulbs have a terrific appeal because they last much longer, and their size allows for more flexibility in designing navigation lights and beacons.

Ironically, we have inadvertently combined two technologies without fully calculating their impact on each other. In the past year, I have received numerous complaints from military, police, and emergency medical services (EMS) pilots indicating that their NVGs could not discern LED lights.

I first encountered this problem while working as a heliport inspector in Alberta, testing portable lighting systems for heliports. During testing, the pilots reported being unable to see green LED. We initially believed the colour was causing the problem: NVGs tend to make everything appear in greenish hues, and so we thought they must be drowning out the green LED.

Within weeks of our testing, we received other calls, but now about red and white LED lights. A military crew operating near a wind farm in Ontario reported that their NVGs could not see the red obstruction lights on the windmill towers. Some Royal Canadian Mounted Police (RCMP) pilots had reported being unable to see red LED lights on towers and on some automobiles; red LED Christmas lights were also invisible.

As the problem became more widespread, we contacted the National Research Council Canada (NRC) in Ottawa, Ont., to look into the matter. Dr. Gregory Craig confirmed that the NRC crews had made the same observation in their work. Dr. Craig provided the following numbers on NVG sensitivity and the LED spectrum (all measured in nanometres). The bottom line is this: The most commonly used LED lights peak at 623 nm; NVGs begin "seeing" at 645 nm and peak between 660-850 nm.

Photo: Jeff Calvert

Night vision goggles are becoming mainstream

Some LED lights peak at around 660 nm and would thus be visible to NVGs. However, it is unclear how prevalent their use is. The easy answer would be to simply use 660 nm LED lights. However, current regulations do not specify this nanometre reading as a requirement.

Furthermore, current obstruction lighting regulations do not require towers of lower than 300 ft to be lit unless they are an obvious hazard to aviation—such as very close to an airport or along an air route. This regulation has some flaws as it was conceived with fixed-wing operations in mind. However, the heaviest use of NVGs occurs away from those areas and often at or below 300 ft. As NVGs gain popularity, more fixed-wing aircraft will undoubtedly be using them. It may also be possible to see pipeline, wildlife, anti-poaching patrol, police, or even spray aircraft using them, all of which operate at or below 300 ft as required by their missions.

As Transport Canada Civil Aviation (TCCA) and the NRC continue to work together and with other interested agencies, it is important to get the word out to industry that obstructions may not be lit even when you think they should be. For those using NVG technology, be aware that you may not see LED lights on towers or even on another aircraft.

So, going night flying anytime soon? Check NOTAMs, plan your route carefully, do a dry run during daylight hours (if possible), and mark obstructions on your map or in your global positioning system (GPS). And remember that while your NVGs are a great tool, they do not exactly turn night into day. So keep vigilant, and take the odd peek outside under your nogs just to spot those elusive LED lights. △

I'll Just Sneak Through Here…They'll Never See Me if I Stay Low

by Bob Grant, Civil Aviation Safety Inspector, Airspace Standards and Procedures, Standards, Civil Aviation, Transport Canada

Of all human failings, the most insidious and probably the most common is "If I had it to do over again, I would have done it differently." But, unfortunately, we can never *should have, would have, could have* the next day.

The pilot was delayed, the departure time was set back, and the schedule was now very restrictive. He could make the trip before dark if he took the direct route through the hills to the north of a large metropolitan area. Getting to destination before nightfall was essential as he had an early evening sales appointment that his boss said he could not miss. There was no room for compromise.

The weather was forecast to be fairly good en route with lowering ceilings and visibility in the hills to the north. He could alter his track a bit to the south to stay in the lower terrain if he ran into weather problems. He'd increase his speed a bit and still make destination on time. There was one more problem, and it was a big one. NOTAMs revealed that a 30-NM restricted area had been created around the international airport of the metropolitan area to help provide security for a visiting head of state. Passage through the area was based on a number of requirements, one of them being a serviceable transponder, and his was down for maintenance. He knew there was no point in asking for clearance without a transponder and, as he was being forced toward the restricted airspace by deteriorating weather, he was compelled to make a decision that he would live with for the rest of his life.

He elected to descend. His rationale was that air traffic control radar wouldn't be able to see him and he would get through the area quickly and be on his way. His rationale was flawed. ATC had a backup. The military was present to provide security identification and possible enforcement. His track was observed, and a fighter aircraft was dispatched to escort him out of the restricted area.

He was about halfway through the top 4 NM of the restricted area when his system received a large jolt of reality that would forever affect his life. A large, ominous, dark aircraft appeared off his left wing. The appearance of an aircraft, so close and of this type, had never crossed his mind.

His first and last reaction was to bank hard away from the perceived danger. His last conscious thought was of a crushing substernal chest pain followed by shortness of breath and darkness.

This is a bit of fiction, but could it be true? Unfortunately, yes.

In late 2008, a congress of leaders from Francophone nations was held in Québec City. The federal agency responsible for security at the event asked the Canadian Forces for some air support. During the three-day event, 22 airspace violations were recorded. Military aircraft prosecuted most of these violations. To say that a number of pilots in the Québec area were surprised by visits from military aircraft would be an understatement.

Earlier this year, the President of the United States visited Ottawa. During his short six-hour visit, a commercial helicopter violated restricted airspace that had been established to add security.

Over the past five years, over 400 airspace violations have occurred in Canadian airspace.

People make mistakes—that's human nature. But post 9/11 security of airspace has increased dramatically, and there is less margin for error. Military presence has increased with more and more intercepts being conducted. If pilots continue to disregard restricted areas, it's only a matter of time before a very serious occurrence takes place with, perhaps, loss of life. In simple terms, restricted airspace means just that: Don't go there unless you request and receive permission from the controlling agency.

The Aeronautics Act

Article 5.1

The Minister or any person authorized by the Minister may by notice prohibit or restrict the operation of aircraft on or over any area or within any airspace, either absolutely or subject to any exceptions or conditions that the Minister or authorized person specifies, if, in the opinion of the Minister or authorized person, the prohibition or restriction is necessary for aviation safety or security, is necessary for the protection of the public or is in the public interest.

Canadian Aviation Regulations (CARs)

Orders Prohibiting or Restricting Aircraft Operation

601.18 *The Minister may make orders prohibiting or restricting the operation of aircraft over such areas as are specified by the Minister, either absolutely or subject to such exceptions or conditions as may be specified by the Minister.*

IFR or VFR Flight in Class F Special Use Restricted Airspace or Class F Special Use Advisory Airspace

601.04 (1) The procedures for the operation of aircraft in Class F Special Use Restricted airspace and Class F Special Use Advisory airspace are those specified in the Designated Airspace Handbook.

(2) No person shall operate an aircraft in Class F Special Use Restricted airspace unless authorized to do so by the person specified for that purpose in the Designated Airspace Handbook.

(3) For the purposes of subsection (2), a person specified in the Designated Airspace Handbook *may authorize the operation of an aircraft where activities on the ground or in the airspace are not hazardous to aircraft operating in that airspace and access by aircraft to that airspace does not jeopardize national security interests.*

What is it about these documents that is so hard to understand? Restricted and prohibited mean just that: Stay out unless you have been granted permission to enter. If you violate restricted airspace, you will be charged under the CARs. Penalties upon conviction range from monetary fines and/or loss of pilot privileges. In addition, depending on the security to be enforced, punishment could be far more severe. I quote the last line from interception procedures issued by the Federal Aviation Administration (FAA) for all aircraft operating in United States national airspace: "**BE ADVISED THAT NONCOMPLIANCE MAY RESULT IN THE USE OF FORCE.**" Similar words were used in 2002 when Canada hosted the G8 Summit in Kananaskis, Alta. The threat of a terrorist situation is real, and so are the counter-measures.

The Winter Olympics will be held in the Vancouver area next February, and special airspace restrictions will be in place to provide appropriate levels of safety and security. For those who, for whatever reason, find themselves inside restricted airspace, rest assured you will be intercepted.

To that end, I'm repeating the information found in part or in total in the CARs, *Canada Flight Supplement* (CFS), section F on "Interception of Civil Aircraft" and "Signals For Use in The Event of Interception" and the *Transport Canada Aeronautical Information Manual* (TC AIM).

INTERCEPTION OF CIVIL AIRCRAFT

Interceptions are made only where the possibility is considered to exist that an unidentified aircraft may be truly hostile until definitely proven to the contrary. Intercepted aircraft should maintain a steady course and

All pilots should know the interception signals, in case something like this happens.

under no circumstances take retaliatory action such as shining a light on an interceptor or attempt evasive action. Retaliatory action on the part of an intercepted aircraft could be construed as a hostile intent and might result in drastic consequences. Practice interceptions are not carried out on civil aircraft.

INTERCEPTION SIGNALS

The word "interception" in this context does not include intercept and escort service provided, on request, to an aircraft in distress, in accordance with the International Civil Aviation Organization (ICAO) *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual* (Doc. 9731).

An aircraft which is intercepted by another aircraft shall immediately:

1. follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals (see following page);
2. notify, if possible, the appropriate air traffic services unit;
3. attempt to establish radio communication with the intercepting aircraft or with the appropriate intercept control unit, by making a general call on the emergency frequency 121.5 MHz and repeating this call on the emergency frequency 243.0 MHz, if practicable giving the identity and position of the aircraft and the nature of the flight;
4. if equipped with transponder select Mode A Code 7700, unless otherwise instructed by the appropriate air traffic services unit.

If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, the intercepted aircraft shall request immediate clarification while continuing to comply with the instructions given by the intercepting aircraft.

SIGNALS FOR USE IN THE EVENT OF INTERCEPTION

SIGNALS INITIATED BY INTERCEPTING AIRCRAFT AND RESPONSES BY INTERCEPTED AIRCRAFT

Series	Intercepting Aircraft Signals	Meaning	Intercepted Aircraft Responds	Meaning
1	DAY - Rocking wings from a position in front and, normally, to the left of intercepted aircraft and, after acknowledgement, a slow level turn, normally to the left, on to the desired heading. Flares dispensed in immediate vicinity. NIGHT - Same and, in addition, flashing navigational lights at irregular intervals. Flares dispensed in immediate vicinity. NOTE 1. Meteorological conditions or terrain may require the intercepting aircraft to take up a position in front and to the right of the intercepted aircraft and to make the subsequent turn to the right. NOTE 2. If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race-track patterns and to rock its wings each time it passes the intercepted aircraft.	You have been intercepted. Follow me.	AEROPLANES: DAY - Rocking wings and following. NIGHT - Same and, in addition, flashing navigational lights at irregular intervals. HELICOPTERS: DAY or NIGHT - Rocking aircraft, flashing navigational lights at irregular intervals and following. NOTE - Additional action by intercepted aircraft is prescribed in paragraph "INTERCEPTION SIGNALS".	Understood, will comply.
2	DAY or NIGHT - An abrupt breakaway manoeuvre from the intercepting aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	AEROPLANES: DAY or NIGHT - Rocking wings. HELICOPTERS: DAY or NIGHT - Rocking aircraft.	Understood, will comply.
3	DAY - Circling aerodrome, lowering landing gear and overflying runway in direction of landing or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. NIGHT - Same and, in addition, showing steady landing lights.	Land at this aerodrome.	AEROPLANES: DAY - Lowering landing gear, following the intercepting aircraft and, if after overflying the runway landing is considered safe, proceeding to land. NIGHT-Same and, in addition, showing steady landing lights (if carried). HELICOPTERS: DAY or NIGHT - Following the intercepting aircraft and proceeding to land, showing a steady landing light (if carried).	Understood, will comply.

SIGNALS INITIATED BY INTERCEPTED AIRCRAFT AND RESPONSES BY INTERCEPTING AIRCRAFT

Series	Intercepted Aircraft Signals	Meaning	Intercepting Aircraft Responds	Meaning
4	AEROPLANES: DAY - Raising landing gear while passing over landing runway at a height exceeding 300 m (1 000 ft) but not exceeding 600 m (2 000 ft) above the aerodrome level, and continuing to circle the aerodrome. NIGHT - Flashing landing lights while passing over landing runway at a height exceeding 300 m (1 000 ft) but not exceeding 600 m (2 000 ft) above the aerodrome level, and continuing to circle the aerodrome. If unable to flash landing lights, flash any other lights available.	Aerodrome you have designated is inadequate.	DAY or NIGHT - If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate aerodrome, the intercepting aircraft raises its landing gear and uses the Series 1 signals prescribed for intercepting aircraft. If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood. Follow me. Understood, you may proceed.
5	AEROPLANES: DAY or NIGHT - Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood.
6	AEROPLANES: DAY or NIGHT - Irregular flashing of all available lights. HELICOPTERS: DAY or NIGHT - Irregular flashing of all available lights.	In distress.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood.

In closing, it is imperative in today's security environment for pilots to be cognizant of airspace restrictions and fully aware of the procedures to follow if intercepted. When it comes to restricted airspace, fly smart and fly safe. △

Flight in the Vicinity of Convective Weather

by Thomas Smyth, Civil Aviation Safety Inspector, Airline Standards, Standards, Civil Aviation, Transport Canada

Since the earliest days of flight, convective weather has posed many risks to commercial and general aviation. Whereas some convective weather systems present little risk to aviation activities, others are extremely hazardous. The focus of this article will be on the extreme events such as thunderstorms, and specifically during the approach and landing phases of flight.

The summer season in Canada can offer some of the most enjoyable flying conditions of the year. However, the heat of the summer also provides the energy for the formation of powerful air-mass and frontal thunderstorms. The chances of encountering a thunderstorm will largely depend on where you are flying within Canada. The Yukon Territory, Nunavut Territory, Northwest Territories, and British Columbia have the fewest number of thunderstorms each year. Alberta through to Nova Scotia, on the other hand, average 20 to 30 days of thunderstorms each year with some localized areas getting more, such as southern Saskatchewan, which may experience daily thunderstorms during the month of July. Thunderstorms are evolving phenomena as they have several stages to their life cycle, which generally last one to two hours. The first stage, called the developing stage, is characterized by updrafts that can be seen as bubbling cumulus cloud with rapid vertical growth. The mature stage follows and is the most likely time for hail, heavy rain, and frequent lightning. The dissipating stage signals the end of the life cycle, but by no means the end of the hazards generated by the thunderstorm since strong winds and lightning can still be present. Pilots should be aware of the characteristics of each stage—along with their associated hazards—and learn to recognize them while flying.

During their initial training, pilots are taught about the power and dangers of thunderstorms. They are also taught that aircraft of any size are no match for a thunderstorm, as many accidents have proven. Windshear, microbursts, hail, heavy rain, lightning, and reduced visibility are some of the hazards of thunderstorms that may be encountered during the approach and landing phase of flight. The consequences of flying through such conditions can range from experiencing uncomfortable turbulence to crashing short of the runway. We can reduce the risks of thunderstorms to an acceptable level by giving ourselves the tools to make informed decisions so that we can manage the threat appropriately. These tools include weather information gathered prior to flight and especially en route, onboard weather detection, alternative plans that are devised prior to the flight, and of course, common sense. The objective is to prepare for the flight so that we are not forced into a situation where we need to make a critical decision under a great deal of stress because, as we all know, such decisions are not usually our best.

Whether you are flying using instrument flight rules (IFR) or visual flight rules (VFR), the hazards from thunderstorms during the approach and landing are the same. Let's look at an example: An approaching thunderstorm will be preceded by a gust front as cold, dense air descends from the expanding storm and strikes the ground, moving outward at speeds that can approach 50 kt. The gust front creates medium-to-severe turbulence, which can cause small, general aviation aircraft to momentarily depart controlled flight and larger aircraft to experience some very uncomfortable turbulence. As the thunderstorm and the aircraft move closer to the airport, the level of risk will increase, especially as the aircraft descends for a landing. If caught in a microburst, the aircraft would have great difficulty recovering given its close proximity to the ground. In the recent past, this phenomenon has contributed to several fatal accidents involving large aircraft.

With thunderstorms nearby, even being on the landing roll can bring significant challenges. Rapid changes in wind velocity and direction can change a 20-kt headwind to a 20-kt tailwind very quickly, leading to the aircraft touching down well past the normal touch-down point. The problems of a long landing can be compounded by deteriorating runway conditions because a runway that was dry only minutes before can not only become wet from a heavy downpour, but can reach the point where the runway is considered contaminated (more than 3 mm of water). Hydroplaning and loss of directional control, particularly if there is a crosswind, can be expected in these conditions. There have been numerous accidents in which pilots had the good judgment to navigate around storm cells while approaching the airport, but then landed in heavy rain and overran the runway due to contamination of the runway surface by water.

Pilots should also be aware that airports currently do not have the technology to detect if runways are contaminated by water, but can only report that the runway is wet.

Now for the human factors side of this issue: for all the positive characteristics we pilots have, our focus on the final objective can sometimes override common sense. It would be difficult to find a pilot who thought that landing at an airport during a thunderstorm was a good idea, but even with all we know about this topic, it still happens, and often with tragic consequences. Poor decision making can be caused by many factors, such as fatigue, lack of information, and inexperience. To a pilot, a thunderstorm is an obstacle in the way of the ultimate goal of the flight, which is arriving at the destination. When a thunderstorm is encountered en route to the destination, there is usually a way around it. However, when the thunderstorm is positioned close to an airport, and the aircraft is on final approach, it is easy to say "The aircraft ahead of us landed safely; we should be fine as well," because the goal of the flight is so close. Still, the weather conditions can quickly change for the worse, making a successful landing all but impossible. Each situation is unique, and just because you were able to make the approach and landing in similar conditions last time does not mean that luck will be on your side this time.

Windshear- and weather-detection technology that is available for airports and on board aircraft is helping to reduce the risks associated with convective weather by giving pilots and air traffic controllers the information they need to make informed decisions and avoid the potentially catastrophic results of flying into convective activity. Technology, though, is not the final solution to the risks presented by thunderstorms, but along with education and awareness, the risks can be greatly reduced, and flight operations in the vicinity of thunderstorms made as safe as possible. △

Regulatory Requirements for Flying Powered Para-gliders

by Martin Buissonneau, Recreational Aviation Inspector, Flight Training Standards, Quebec Region, Civil Aviation, Transport Canada

This article focuses mainly on powered para-gliders. The regulation for obtaining a pilot permit—ultra-light aeroplane restricted to powered parachutes applies to both powered para-gliders and powered parachutes with trikes. However, flight instruction techniques differ for these two types of aircraft. A tandem trike can accommodate the instructor on board; on a powered para-glider, the instruction and supervision of the student-pilot is conducted from the ground.

Given the rise in popularity of flying powered para-gliders, the following is a review of the regulatory requirements to legally fly a powered para-glider in Canada. Firstly, it should be noted that four types of aircraft are grouped into the category of ultra-light aeroplane:

- the three-axis ultra-light aeroplane;
- the powered hang-glider (also called a trike);
- under the general term "powered parachute," the powered para-glider; and
- the powered parachute with trike.

A powered para-glider usually consists of an elliptical flexible parachute-type aerofoil made up of cells—also called a para-glider wing or parafoil—and a frame assembly, which is attached underneath by suspension lines. This frame assembly provides the support frame for the harness (in which the pilot sits) and for the engine, attached to which are the reduction gear and the propeller that propel the powered para-glider. These aircraft do not have cockpits, and the pilot is completely out in the open, with his legs acting as the landing gear upon takeoff and landing. The powered para-glider is also called "paramotor," depending on the community.

Photo: M. Buissonneau

Flight in a powered parachute

The powered parachute with trike also has a flexible parachute-type aerofoil and suspension lines, which can usually support more weight than a powered para-glider. The wing's suspension lines are attached to a trike with three or four wheels, and the powerplant is attached to the trike. The pilot sits in the trike and does not have to support the weight of the powerplant or run to take off.

Under similar atmospheric conditions, the performance of powered parachutes depends on various factors including the wing characteristics, the engine power, and the weight of the pilot with the frame assembly or trike (depending on the type of aircraft). The powered parachute's slow cruise speed and straightforward piloting allow for recreational flight at its best. Except for training flights, no commercial or passenger transport activities are allowed in powered parachutes. Operating limits for powered para-gliders and powered parachutes with trike, such as wearing a protective helmet while flying on board these types of aircraft, are defined in *Canadian Aviation Regulation* (CAR) **602.29**.

As is the case with other types of ultra-light aircraft in Canada, a pilot permit is required to fly a powered para-glider, the powered para-glider must be registered, and the owner must have liability insurance covering risks of public liability. We will now go into more detail on CARs requirements.

A) Requirements for a pilot permit—ultra-light aeroplane restricted to powered parachutes

The following is a summary of CAR **421.21**.

1- Age and medical fitness

The minimum age required to hold this type of permit is 16. The minimum Medical Certificate category is 4 (without the option of having the signature of a doctor approved in Canada). A request for a category 4 Medical Certificate is made by completing the Medical Declaration for Licences and Permits Requiring a Category 4 Medical Standard (form number 26-0297), which can be found on the following Transport Canada Web site: www.tc.gc.ca/civilaviation/general/personnel/apps.htm.

Category 3 and 1 Medical Certificates may also validate ultra-light aeroplane pilot permits restricted to powered parachutes as well as student-pilot permits, which should be issued *before* conducting solo flights during training.

2- *Knowledge*

An index of Canadian flight training units (FTU) can be found on the following Transport Canada Web site: www.tc.gc.ca/aviation/activepages/ftae/index.aspx. Two main fields should be completed: "Region" and "Category" (type of aircraft used). In this case, choose "Powered parachutes," which includes both powered para-gliders and powered parachutes with trikes.

As with other categories of aircraft, powered para-glider flight training is divided into two parts—theoretical and practical—which are usually taken simultaneously. The theoretical part (ground school) is usually a lecture-type class given to several student-pilots at once. The mandatory subjects covered are air law, practices and procedures, aerodynamics, air navigation, meteorology, engines, airframes, flight instruments, flight operations, human factors, the pilot decision-making process, and emergency procedures. A complete subject list can be found in CAR **421.21**. In addition, details of each subject are grouped together in Transport Canada's publication *Study and Reference Guide—Pilot Permit—Ultra-light Aeroplane* (TP 14453), which can be found on the following Web site: www.tc.gc.ca/CivilAviation/publications/tp14453/menu.htm.

Ground school training must be a *minimum* of 20 hours in length and cover the subjects mentioned above. Once ground school has been completed, an 80-question written exam must be taken at a Transport Canada office and passed with a *minimum* of 60 percent. The time allotted for the written exam is three hours.

3- *Experience*

Within the 24 months preceding the date of application for the permit, the applicant shall have acquired a *minimum* of 5 hours of flight time, including a *minimum* of 30 takeoffs and landings, in a powered parachute (powered para-glider) under the direction and supervision of the holder of a flight instructor rating—ultra-light aeroplane or —aeroplane. Given the configuration of powered para-gliders, which usually only have one place, the flight time and takeoffs and landings will be conducted by the student-pilot in solo flight. Two-place powered para-gliders do exist; however, they are primarily used for familiarization flights, and they do not have dual controls. This explains the exemption from dual instruction flight time included in CAR **421.21(7)*(c)***. Since there is no room for the instructor on board the powered para-glider, a "flight simulator" may be used to prepare for the flight. This "flight simulator" consists of a frame that suspends the student a few feet off the ground so that the basics of safe flight in a powered para-glider can be taught. During in-flight training, the instructor—who remains on the ground—guides and corrects the student-pilot using two-way radios. To avoid loss of concentration or an increase in workload while in flight, the student-pilot may respond with leg movements using predetermined signals. Some FTUs use a winch as the launch method for takeoff at the beginning of the training. This allows for a better transition after the "flight simulator" lessons.

Depending on the student-pilot's age, physical condition, skill level, co-ordination, ability to concentrate, and many other factors, the duration of in-flight training may exceed the required 5 hours of flight time and 30 takeoffs and landings. It is important to note that these regulatory flight time requirements represent the minimum experience necessary. To be issued a pilot permit, the student-pilot must demonstrate the ability to conduct the appropriate normal and emergency manoeuvres for a powered para-glider—which were learned during the training program—to a skill level equivalent to that of the holder of a pilot permit—ultra-light aeroplane restricted to powered parachutes. Therefore, the amount of flight time necessary to reach that skill level may vary from one person to another.

The student-pilot must have been issued a student-pilot permit beforehand in order to legally be allowed to act as pilot-in-command of the powered para-glider and thus gain solo flight experience until a pilot permit—ultra-light aeroplane restricted to powered parachutes is issued. These solo flights must always be carried out under the direction and supervision of a qualified flight instructor. To be issued a student-pilot permit, the student-pilot must meet certain administrative conditions, obtain a medical certificate, and pass the FTU's pre-solo examination. The subjects covered in the examination and the requirements for being issued a student-pilot permit are described in CAR **421.19(2)*(d)*(i)**.

Once the levels of knowledge, experience, and skill required to obtain a pilot permit—ultra-light aeroplane restricted to powered parachutes have been met (within the 12 months preceding the permit application), the student-pilot will be given a letter of competency signed by the qualified instructor in order to apply to Transport Canada for the permit.

The Application for Flight Crew Permits/Licences (form number 26-0194) should be completed and the appropriate fees paid.

When issued, the pilot permit—ultra-light aeroplane will be endorsed with "parachutes only," whether it is a pilot permit for a powered para-glider or a powered parachute with trike. If permit holders later wish to have the restriction removed, they will have to be trained on the type of aircraft chosen, gain the required experience, and submit a request to Transport Canada to have the permit changed.

Holders of a recreational pilot permit—aeroplane or a private pilot licence—aeroplane or higher have the right to act as a pilot-in-command of a powered para-glider or any type of ultra-light aeroplane, as per their aviation document. However, it would be appropriate to receive training with a qualified instructor, who is skilled on the type of aircraft chosen, given the significant differences in design and flying techniques between an aeroplane and a powered para-glider. For holders of a pilot licence—helicopter, —glider, or —balloon, or of a pilot permit—gyroplane, the regulatory requirements for obtaining a pilot permit—ultra-light aeroplane restricted to powered parachutes apply: powered para-glider flight training must be successfully completed. Some credits may be granted.

Feature

B) Registration of a powered para-glider

In Canada, powered para-gliders must be registered. The applicant must submit an Application for Registration of Ultra-light or Advanced Ultra-light Aeroplanes (form number 26-0521) to Transport Canada, along with a document certifying title to the aircraft (for example a bill of sale), a photo of the powered para-glider's data plate clearly showing the name of the manufacturer, the model, and serial number, and the fee payment. The registration marks should be displayed and clearly visible on the powered para-glider (CAR **202.01**).

C) Liability insurance covering risks of public liability

Powered para-glider owners must have liability insurance covering risks of public liability in an amount that is not less than $100,000 (CAR **606.02**).

D) Bilingual placard

Since powered para-gliders do not require a flight authority, such as a certificate of airworthiness, a bilingual placard that states "This aeroplane is operating without a certificate of airworthiness/Cet avion est utilisé sans certificat de navigabilité" must be affixed to a surface in plain view of any occupant seated at the flight controls (CAR **602.29**).

Restricted operator certificate with aeronautical qualification

Some powered para-glider pilots communicate with each other using small two-way radios called family radio service (FRS) or general mobile radio service (GMRS). These little walkie-talkies broadcast on the UHF band. However, these devices are not compatible with frequencies reserved for aviation, thus preventing powered para-glider pilots from hearing and being heard by aircraft equipped with approved aviation radios.

There are two-way aviation radios on the market today that are about the same size as the FRS and GMRS. In order to communicate using these devices, the pilot must pass an exam to receive a restricted operator certificate issued by Industry Canada. Industry Canada-accredited examiners, who usually work in the field of aviation, conduct the exams and take care of the administrative procedure. The exam may also be conducted at one of the Industry Canada district offices. More information about the certificate may be found on the following Industry Canada Web site: www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01397.html#sect3.

For more information about the subjects discussed in this article, visit the following Transport Canada Web sites: www.tc.gc.ca/civilaviation/general/recavi/Ultralight/menu.htm and www.tc.gc.ca/CivilAviation/Regserv/Affairs/cars/Part4/Standards/421.htm#421_21. You may also contact your Transport Canada regional or district office.

Please note that the latest revision or amendment to the CARs and their related standards constitutes the official document. You must always refer to the official document. In addition, the official document ALWAYS has precedence over the information presented in this article. △

MAINTENANCE AND CERTIFICATION

Landing Gear Maintenance "Best Practices"

by James Careless, Aircraft Maintenance Technology (AMT) Contributor, AMT on-line magazine (www.amtonline.com). This article originally appeared in the October 2008 issue of AMT Magazine *and is reprinted with permission.*

Vulnerability here can increase overhaul costs

Landing gear: At first glance, it appears to be the most rugged part of an aircraft. But landing gear's apparent robustness masks its vulnerability to corrosion and stress damage due to impacts—a vulnerability that can result in a substantially reduced operational lifespan (well below manufacturers' specs) and increased overhaul costs.

What can an aircraft technician do to keep landing gear in top condition between scheduled overhauls? According to Goodrich's Landing Gear Division in Burlington, Ont., quite a lot.

Understanding the life of landing gear

The life of an average aircraft's landing gear is a hard one. At all times, its pressurized oleo-pneumatic shock absorbers exert stress on their metal housings. Meanwhile, the force of hitting the runway upon landing stresses the entire system no matter how gentle the landing. Horizontal forces are also exerted on the gear as the aircraft brakes during landing or accelerates during takeoff.

That's not all. Towing strains the forward landing gear, especially if the tow is not executed gracefully. Add impacts and collisions with other objects on the tarmac, and landing gear can be bent, cracked, and even collapsed due to aircraft accidents.

In the hangar, "landing gear can be damaged by inappropriate jacking and other forms of mishandling," says Jay Lind, Goodrich Landing Gear Quality Assurance Manager. "Even pressure washing the gear to make it look spotless can cause problems because it can force water into the bushings and joints, causing corrosion."

If this isn't enough to worry about, certain solvents such as paint stripper can cause "hydrogen embrittlement" in gear. What happens is that atomic hydrogen found in such substances interacts chemically with the high tensile steel in the gear, causing the affected areas to transform chemically into a brittle alloy with a risk of fracturing. "The only way to counteract hydrogen embrittlement is to remove the affected component and bake it in a special oven at 375°F for 23 hours," Lind tells AMT. "This allows the hydrogen atoms to migrate to the surface and then escape."

Maintenance best practices

When damaged aircraft landing gear comes into the shop, it costs more to overhaul than landing gear that has been maintained properly. Here is what you can do to keep your landing gear costs down.

The first step is lubrication. It may sound simple, but insufficient lubrication during regular usage causes unnecessary wear-and-tear in many of the system's components.

"Lubrication is critical to the movement of all articulated parts and joints of landing gear," says Lind. "Proper lubrication ensures smooth functioning, less friction and wear, and the appropriate transfer of forces throughout the gear during use. Lubrication is key to keeping out water, de-icing fluid, and other corrosion-causing substances. Make no mistake; corrosion is a real problem for landing gear."

Before you lubricate, be sure to check the aircraft's manual to find out what substances you can and cannot use. "In some cases, using the wrong grease can be as detrimental as insufficient lubrication because it can cause damage to the gear's bushings," says Lind.

Another best practice in maintaining landing gear is protecting it from paint strippers and other corrosive agents. This is due to the interaction between hydrogen and the high tensile steel used in the gear. If acids are allowed to contaminate the gear, the resulting hydrogen embrittlement can lead to cracks. At the least, such cracks are expensive to fix. At the most, the cracks may be sufficiently large that the component has to be scrapped and replaced—hopefully before the gear fails in use.

Avoiding impacts of any kind is one more best practice for landing gear maintenance. The pressurized shock-absorbing struts are particularly vulnerable to nicks, dings, and dents. "Any change in the shape of the struts, or indeed any other support structures of the gear, results in

'stress risers' in the component," says Lind. "This makes it more vulnerable to failure due to metal fatigue, potentially long before the next scheduled overhaul comes about."

When things do go wrong—and things do—it is important to document the kind of accident suffered by the gear and what visual damage can be seen. The smartest thing to do in such cases is to swap out the component immediately and send it off for nondestructive testing and repair, accompanied by the record of what happened to it. This allows landing gear manufacturing repair organizations (MRO) such as Goodrich to do the repair work accurately before the damage becomes more serious and thus more expensive to fix.

Documentation of each serialized part of your gear is also vital for keeping overhaul costs down. "Like engines, serialized components in landing gear have specified operational lifespans, after which time they must be replaced," says Lind. "In cases where we do not have such information, we have no choice but to scrap the undocumented part and replace it with something new. The same is true for parts with illegible serial numbers. Unless we can be sure of their history and lifespan, we have to scrap them."

Operational conclusions

The landing gear best practices outlined by Lind can be distilled into a series of "operational conclusions" or fancy words for things you should do as a matter of course to keep your gear at optimal condition.

First things first: For every piece of gear you service, go over the manuals. In particular, compile a list of "forbidden substances" that should not be used around unprotected gear. Also double-check the regular maintenance/lubrication protocols because these can differ from aircraft to aircraft.

Next, go over the documentation for the gear you service. Is there a complete history for each serialized component? If not, spot the holes and be prepared to replace the undocumented parts. After you've incurred this expense, keep complete records to avoid having to pay for it again.

Third, review your shop's procedures to ensure that other unrelated work such as paint stripping and cleaning are not putting your gear at risk. Where required, either protect your gear from overspray or change your stripping/cleaning processes.

Fourth, ensure that there is a complete reporting procedure for each aircraft's landing gear, both to alert you to accidents when they happen and to provide accurate historical information for the overhaul shop. This may require a slight change in corporate culture, i.e. to one where reporting a mishap doesn't necessarily lead to disciplinary action. If your staff is scared to report accidents, they won't . . . and you will pay the price later during overhauls.

Finally, don't be fooled by the apparent robustness of landing gear. Like every other critical system on an aircraft, landing gear has its own vulnerabilities that have to be monitored and cared for—at least if you want to keep overhaul costs down and flight safety up. △

Don't Cry "Wolf": How to Reduce the Impact of False ELT Alerts

by Carole Smith, Communications, National Search and Rescue Secretariat (NSS)

All false emergency locator transmitter (ELT) alerts place a burden on Canada's search and rescue system, and most importantly, may divert resources from responding promptly to an actual aircraft in distress. Pilots, air traffic controllers, and flight service specialists who overhear ELT signals on 121.5 MHz also take time away from other duties to forward these alerts to rescue authorities.

A few simple rules of thumb can help aircraft owners, operators, and maintainers minimize false ELT alerts. Search and rescue is a shared responsibility, and we can all do our part.

406 MHz ELTs

An ELT operating on a primary frequency of 406 MHz sends a half-second digital burst transmission once every 50 s. This coded signal is captured by the Cospas-Sarsat satellites, and relayed automatically to search and rescue authorities. The unique code is then cross-referenced with the Canadian Beacon Registry to obtain vital information about the aircraft in distress.

It is important to note that all 406 MHz ELTs also transmit a continuous analog homing signal on 121.5 MHz. While the 121.5 MHz signal is no longer detected by satellite, it is used by search and rescue aircraft and ground crews to travel the final distance to the scene of an accident, particularly when visibility is reduced due to precipitation, terrain, vegetation, or darkness.

The following actions can help minimize false alerts from 406 MHz ELTs:

- Register your 406 MHz ELT with the Canadian Beacon Registry System. It's required by the *Canadian Aviation Regulations* (CARs).

Registration is free, and can be completed on-line at www.canadianbeaconregistry.forces.gc.ca; by calling 1-877-406-SOS1 (7671); or by faxing a completed registration form to 1-877-406-FAX8 (3298). It is recommended that registration be completed even before installation. If a 406 MHz ELT is activated by mistake while being installed, an alert can be more quickly resolved if a point of contact has been registered.

- Carry out routine operational checks of 406 MHz ELTs in strict accordance with the manufacturer's instructions, as each model has its own unique test procedure. Consider building this protocol into your operating checklists, as applicable. The manufacturer's documentation will also indicate how often these checks should be carried out to ensure that the maximum battery life of the unit is preserved.
- Routine 406 MHz ELT tests that involve transmission of the 121.5 MHz homing signal should only be carried out during the first 5 min of every UTC hour, and for a duration of 5 s or less.
- The digital signal from a 406 MHz ELT that is turned on for approximately 50 s or more will be captured by the search and rescue satellites, and interpreted as a distress transmission. If you believe this may have happened in error, contact the Canadian Mission Control Centre (CMCC) at 1-800-211-8107. The staff will welcome your call, and there is no fine or charge levied by the search and rescue system for inadvertent activations of this kind.
- Keep your Canadian Beacon Registry information up to date. If you or your emergency contacts move, or if you buy, sell, or substantially reconfigure your aircraft (e.g. new paint colours, change floats to wheels, etc.), be sure to update your record. If the aircraft is sold, and the 406 MHz ELT registration is not updated, the original owner will be called if the ELT is triggered. This confusion could delay a rescue effort. It is also a good idea to update your record when the ELT is removed from the aircraft for re-certification or for extended storage.

121.5 MHz ELTs

As of February 1, 2009, signals from ELTs operating on a primary frequency of 121.5 MHz (and/or 243 MHz) are no longer captured by search and rescue satellites. However, 121.5 MHz is still monitored by air traffic control (ATC) towers and flight service stations (FSS) during their hours of operation, and by some aircraft. ELT signals overheard on 121.5 MHz are reported to search and rescue authorities as possible distress transmissions.

The following actions can help minimize false alerts from 121.5 MHz ELTs:

- Test your 121.5 MHz ELT only during the first 5 min of every UTC hour, and for a duration of 5 s or less.
- Contact your closest joint rescue coordination centre (JRCC) if your 121.5 MHz ELT activates by mistake. Include the location, time, and duration of the inadvertent transmission, if known. There is no fine or charge levied by the search and rescue system, and the rescue controller will welcome the opportunity to focus on another case that might involve an actual aircraft in distress.

An important note on ELT disposal

An increasing number of 121.5 MHz ELTs are being removed from service as aircraft are fitted with newer 406 MHz units. It is very important to ensure that these 121.5 MHz units are properly decommissioned, including removing the battery from the unit and disabling the electronics. Several unnecessary searches have concluded at local garbage dumps due to an emergency beacon that had been improperly discarded. Curious children have also activated ELTs and other types of emergency beacons after finding them around the house or workshop. △

Canadian Beacon Registry System: www.canadianbeaconregistry.forces.gc.ca
Tel.: 1-877-406-SOS1 (7671)
Fax: 1-877-406-FAX8 (3298)

Canadian Mission Control Centre (CMCC) (Cospas-Sarsat alerts):
CMCC Trenton 1-800-211-8107

Joint Rescue Coordination Centres (JRCC):
JRCC Victoria 1-800-567-5111 (B.C. and Y.T. only) or +1-250-363-2333
JRCC Trenton 1-800-267-7270 (Canada-wide) or +1-613-965-3870
JRCC Halifax 1-800-565-1582 (Eastern Que. and Atlantic Canada only) or +1-902-427-8200

Fatigue Risk Management System for the Canadian Aviation Industry: Employee Training Assessment (TP 14574E)

This is the third in a seven-part series highlighting the work of the Fatigue Risk Management System (FRMS) Working Group and the various components of the FRMS toolbox. This article deals with TP 14574E, Employee Training Assessment. *Intended for use by trainers, this optional module provides an assessment of employee competence in topics covered in the* Fatigue Management Strategies for Employees (TP 14573E) *workbook. We encourage our readers to consult the complete toolbox documentation by visiting* www.tc.gc.ca/civilaviation/SMS/FRMS/menu.htm. *—Ed.*

The purpose of this assessment is to evaluate individual competence in each of the topics covered in *Fatigue Management Strategies for Employees.* Each chapter in the workbook begins with a set of learning outcomes that detail the knowledge and skills to be learned by the end of each chapter. Students should have completed each of the exercises and knowledge checks in the workbook before beginning this assessment.

The assessment process uses two approaches to evaluate employee competency in fatigue management. First, employees are asked direct questions intended to assess knowledge obtained from the workbook. Employees are also asked to maintain a logbook to demonstrate competence in applying the concepts of fatigue risk management to their specific work, social, and family situations.

This booklet consists of five elements:

- Fundamental Knowledge Questions
- Employee Logbook Instructions
- Acceptable Responses to Fundamental Knowledge Questions
- Logbook Checklist
- Competency Assessment Results

The first two elements form the assessment tasks and should be completed by employees. The Acceptable Responses and the Logbook Checklist are intended primarily for a designated assessor to determine whether employees have provided appropriate answers and information. However, it may be useful to provide this material to employees during the assessment. This will ensure employees know the types of answers/information they are expected to provide for each question. If the answers to the fundamental knowledge questions are provided to employees, the assessor should conduct a verbal assessment, asking questions at random. The assessor should primarily ask the highlighted questions on page 3 of the online document (see link provided below).

The form provided in Competency Assessment Results serves as a certificate of competence. The feedback provided on this form should state whether the individual has demonstrated competence in fatigue risk management and highlight any areas that need further attention.

The assessor may be a safety manager within the organization who has achieved competence in fatigue risk management principles. Alternatively, assessors can be commissioned from external sources (such as universities or private consultants) to provide a more objective examination of employee responses.

How to use this assessment unit

First, ensure the workbook exercises have been completed. These questions can be used to determine how well the topic information has been understood.

Employees should complete the first two parts of the assessment:

- Fundamental Knowledge Questions; and
- Employee Logbook Instructions.

The Fundamental Knowledge Questions can be answered in the space provided in this booklet. The logbook should be completed in a separate notebook on a day-to-day basis for one month. Employee Logbook Instructions outline a number of elements that should be demonstrated and/or considered within the actual work environment. Employees should cover each element in their logbooks. If the organization already practises good fatigue risk management principles, and the employee already understands and uses these principles, the logbook can be completed retrospectively. That is, employees can detail how they approached the required elements listed on pages 9–10 in their specific work environment in the past.

Assessment criteria

The knowledge questions and the logbook form the majority of the assessment criteria. To complete the course, employees should have a one-on-one interview with a designated assessor. The assessor asks random questions from the Fundamental Knowledge Questions to test the employee's understanding. The assessor also asks questions based on the logbook, calling for the employee to describe how various components of fatigue risk management were applied to the specific work situation. Following the interview, the assessor completes the Competency Assessment Results form on page 19 and provides feedback to the employee based on the assessment.

We conclude this overview of TP 14574E by encouraging our readers to view the entire document on-line and familiarize themselves with the five elements described above. Go to www.tc.gc.ca/CivilAviation/SMS/pdf/14574e.pdf. △

RECENTLY RELEASED TSB REPORTS

The following summaries are extracted from Final Reports issued by the Transportation Safety Board of Canada (TSB). They have been de-identified and include the TSB's synopsis and selected findings. Some excerpts from the analysis section may be included, where needed, to better understand the findings. We encourage our readers to read the complete reports on the TSB Web site. For more information, contact the TSB or visit their Web site at www.tsb.gc.ca. *—Ed.*

TSB Final Report A06W0041—Airframe Failure and Collision with Terrain

On March 21, 2006, the pilot of a McDonnell Douglas Helicopters Inc. (MDHI) MD600N helicopter was conducting heli-slinging operations 25 NM northwest of Zama Lake, Alta. (CFT9). The pilot had picked up the fifth and final bag of seismic equipment and was returning to the staging area, approximately 3 NM from the pick-up site. While en route, the tail boom separated from the fuselage and the helicopter crashed into a clearing about 1 600 ft from the pick-up site. The sling load was still attached to the aircraft on a 115-ft longline. The tail boom was found about 240 ft from the main wreckage. The accident occurred at approximately 14:00 Mountain Standard Time (MST). The pilot, the sole occupant, sustained fatal injuries. There was no post-impact fire.

Findings as to causes and contributing factors

1. The attach fitting at the upper right attachment point of the tail boom failed in fatigue. The transfer of loads to the adjacent aft ring structure resulted in the cascading failure of the remaining three tail boom attach fittings and separation of the tail boom from the fuselage.

2. Aircraft control was lost following separation of the tail boom. Safe recovery following this type of structural failure was unlikely.

3. The 25-hr visual inspections allowed by the alternate method of compliance (AMOC) did not identify damage to the tail boom attachment fittings before structural failure.

Safety action taken

The operator voluntarily grounded its fleet of MD600N helicopters pending the replacement of the attachment fittings as per Part 2 of Service Bulletin SB600N-043.

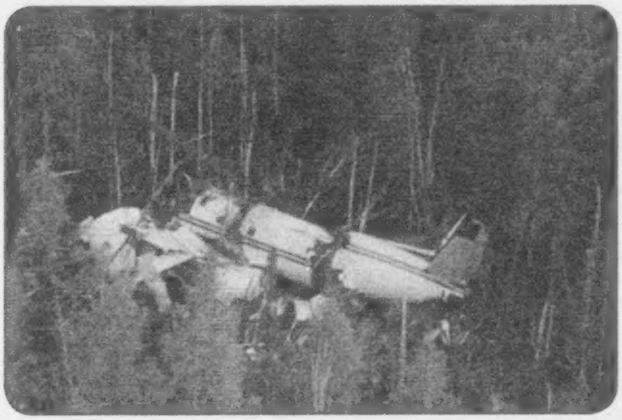
On April 13, 2006, MDHI issued SB600N-043 requiring a borescope inspection of all four attach fittings. Within 25 hr of receipt of the bulletin, the attach fittings were to be replaced. On April 13, 2006, MDHI issued Technical Bulletin TB600N-007R1 regarding modification of the fuselage aft section and tail boom to strengthen the tail boom attach fittings and upper longerons.

On April 27, 2006, the Federal Aviation Administration (FAA) issued Airworthiness Directive (AD) AD2006-08-12. This AD required that additional inspection holes be created in the aft fuselage skin panels, and that the upper and lower tail boom attach fittings, the upper longerons, and angle and nut plates for cracks be inspected. It also required, within a specified time, replacing the aluminum upper right tail boom attach fitting with steel fittings, painting the inspection area, and replacing existing nut plates.

TSB Final Report A06C0062—Loss of Control on Go-Around (Rejected Landing)

On May 14, 2006, a Convair 580A was conducting stop-and-go landings on Runway 36 at the airport in La Ronge, Sask. On short final approach for the third landing, the aircraft developed a high sink rate, nearly striking the ground short of the runway. As the crew applied power to arrest the descent, the autofeather system feathered the left propeller and shut down the left engine. On touchdown, the aircraft bounced, the landing was rejected, and a go-around was attempted, but the aircraft did not attain the airspeed required to climb or maintain directional control. The aircraft subsequently entered a descending left-hand turn and crashed into a wooded area approximately one mile northwest of the airport. The first officer was killed and two other crew members sustained serious injuries. The aircraft sustained

substantial damage. The accident occurred during daylight hours, at 12:45 Central Standard Time (CST).



Findings as to causes and contributing factors

1. The flight crew attempted a low-energy go-around after briefly touching down on the runway. The aircraft's low-energy state contributed to its inability to accelerate to the airspeed required to accomplish a successful go-around procedure.

2. The rapid power lever advancement caused an inadvertent shutdown of the left engine, which exacerbated the aircraft's low-energy status and contributed to the eventual loss of control.

3. The inadvertent activation of the autofeather system contributed to the crew's loss of situational awareness, which adversely influenced the decision to go around at a time when it may have been possible for the aircraft to safely stop and remain on the runway.

4. The shortage and ambiguity of information available on rejected landings contributed to confusion between the pilots, which resulted in a delayed retraction of the flaps. This departure from procedure prevented the aircraft from accelerating adequately.

5. Retarding the power levers after the first officer had exceeded maximum power setting resulted in an inadequate power setting on the right engine and contributed to a breakdown of crew coordination. This prevented the crew from effectively identifying and responding to the emergencies they encountered.

Findings as to risk

1. The design of the autofeather system is such that, when armed, the risk of an inadvertent engine shutdown is increased.

2. Rapid power movement may increase the risk of inadvertent activation of the negative torque sensing system during critical flight regimes.

Other findings

1. There were inconsistencies between sections of the Conair aircraft operating manual (AOM), the standard operating procedures (SOPs), and the copied AOM that the operator possessed. These inconsistencies likely created confusion between the training captain and the operator's pilots.

2. The operator's CV-580A checklists do not contain a specified section for circuit training. The lack of such checklist information likely increased pilot workload.

Safety action taken

On October 30, 2006, the TSB sent a Safety Information Letter (A060037-1) addressing autofeather risks to Transport Canada.

Conair revised its procedures with respect to engine power management to achieve and maintain a stabilized approach.

The operator hired experienced training personnel and is in the process of developing operating procedures specific to their operation.

TSB Final Report A06W0106—Dynamic Rollover

On July 4, 2006, the pilot of a Bell 206B helicopter was conducting water-bucketing operations in support of forest-fire suppression activities approximately 23 NM northeast of Wabasca, Alta. At approximately 16:00 Mountain Daylight Time (MDT), the helicopter contacted trees adjacent to a shoreline, broke up, and came to rest in an inverted position. The pilot, the sole occupant, was fatally injured.

Findings as to causes and contributing factors

1. The pilot undertook a water-bucketing mission for which he did not have the required training and experience.

2. The pilot engaged in flight operations with pronounced allergy symptoms, which probably contributed to reducing his ability to perform complex multi-task missions.

3. It is probable that the pilot took a quantity of an allergy medication that could have affected his ability to stay alert and be aware of all surrounding mission factors.

4. The operator had no system in place to ensure that flight crews did not undertake missions or use equipment for which they were not trained.

Safety action taken

The operator put in place several internal and external audit processes to ensure that pilot training meets all requirements on an ongoing basis. The operator developed a competency card listing all aircraft types and other operations that the individual has been trained on and authorized to perform.

TSB Final Report A06Q0181—Flight in Weather Conditions Unfavourable for Visual Flight, and Collision with Terrain

On October 19, 2006, a Cessna U206F floatplane was carrying out a local tourist flight in the area of Grand-Mère, Que. The pilot and the five passengers took off from the floatplane base at Tortue Lake, Que., at 10:20 Eastern Daylight Time (EDT) in the direction of Piles Lake, Que. After flying over the Grand-Mère hydroelectric dam, the aircraft entered a valley leading to Piles Lake. The weather conditions worsened, and the floatplane entered a fog bank skirting the hills. The pilot lost all visual reference with the ground and tried to keep the aircraft's wings horizontal while applying full power to initiate a climb. The left float struck a tree, and the aircraft pitched downward and ended up on its back. The pilot and passengers evacuated the aircraft uninjured. The aircraft sustained major damage.

Other factual information

On the morning of the accident, two flights had been cancelled because of adverse weather conditions. At about 09:30 EDT, the conditions improved and the chief pilot authorized the flight. The ceiling was estimated at 1 100 ft above ground level (AGL), and visibility was estimated at six miles. A specification on the operator certificate allowed for VFR flights during the day with visibility of

at least one mile when the aircraft was flown at less than 1 000 ft AGL in uncontrolled airspace.

The tourists reported to the dock and waited for their flight, which had already been included on the day's agenda. Departure took place at 10:20 EDT. The pilot established the aircraft at roughly 700 ft AGL, that is, roughly 1 100 ft above sea level (ASL). Visibility was about six miles. However, the weather conditions deteriorated as the flight continued. When the aircraft entered the valley leading to Piles Lake, located about eight miles northwest of Tortue Lake, the pilot communicated by radio with the chief pilot, who was following in another aircraft, and warned him of the presence of fog. He alerted the chief pilot that he was going to do a 180° turn. The aircraft suddenly flew into a thick layer of fog, and the pilot lost visual reference with the ground required for VFR flight. He noticed the trees below the aircraft and applied full power to initiate a climb. At that moment, the left float clipped the top of a tree and the aircraft pitched downward. The aircraft nosed over and flipped onto its back.

Analysis

Since two of the earlier flights had been cancelled because of the weather, it is likely that the pilot was under no pressure from the chief pilot to go ahead with the flight. In consideration of the weather conditions just before departure and the specification on the operator certificate that allowed flying with visibility of at least one mile, the decision to go ahead with the flight can be justified. Yet, although the weather conditions were favourable for visual flight at the time of departure from Tortue Lake, they quickly deteriorated during the approach to Piles Lake. This loss of visibility was consistent with the graphic area forecast (GFA), which had warned that conditions might deteriorate to the point where visibility was reduced to ½ mile with a ceiling at 300 ft AGL.

Flying at low altitude in low-visibility conditions is dangerous. Low-altitude flying gives pilots little time to

see obstacles and take evasive action. The pilot's decision to turn back was late in coming. The consequence of his failure to act was the loss of visual ground references, and the pilot was unable to avoid striking the mountain right in front of him. Although the pilot did possess the necessary licence and qualifications, it is possible that his lack of experience contributed to his late decision.

Findings as to causes and contributing factors
1. The pilot delayed turning back when he encountered adverse weather conditions, which resulted in a loss of visual ground references.

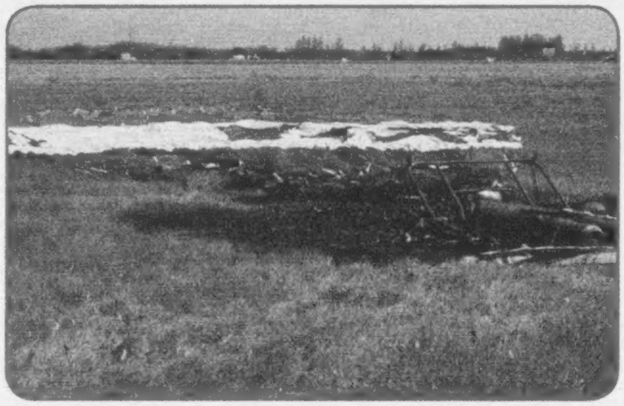
2. On losing his visual ground references, the pilot was unable to avoid striking the mountain right in front of him. The aircraft hit some trees before nosing over and ending up on its back.

TSB Final Report A07C0151—Hard Landing—Fuel Leak and Fire

On August 11, 2007, a FireFly 12B hot air balloon was attempting to land in a field adjacent to Birds Hill Provincial Park near the northern outskirts of Winnipeg, Man. The balloon was operated under a special flight operations certificate issued by Transport Canada. One pilot and 11 passengers were on board, all in the balloon's basket. The flight was a local sightseeing flight originating in the southeast of Winnipeg and terminating in the northeast of Winnipeg.

The flight had been extended beyond Winnipeg as the pilot searched for a suitable landing area in strong winds. The balloon touched down and skipped several times. The basket was dragged on its side for about 700 ft, and tipped over far enough for the burners to strike the ground as the balloon came to a stop. A propane fuel leak occurred and an intense uncontrolled fire ensued as the passengers were beginning to exit from under the partially-inverted basket. All occupants escaped; however, the pilot and two passengers suffered serious injuries in the intense fire. Four other passengers suffered minor injuries, some with burns. Two of the propane tanks and a fire extinguisher canister exploded, and the basket of the balloon was destroyed by fire. The accident occurred at about 09:08 Central Daylight Time (CDT).

Findings as to causes and contributing factors
1. The flight continued even though the winds exceeded the maximum demonstrated winds listed in the balloon flight manual, and were at the upper wind limit specified in the company operations manual.



2. The fuel system was not shut down as recommended in the balloon flight manual procedures for a hard landing, even though a hard landing was likely.

3. Because the balloon was not deflated quickly, the basket was dragged for some 700 ft and the integrity of the burner support structure was lost.

4. As the basket was dragged across the ground, the fuel-line fittings were pulled out at the burner manifolds and liquid propane was released in the vicinity of the pilot lights, resulting in the fire and subsequent explosion.

Findings as to risk
1. There was no mandated requirement for passenger restraint or personal protective equipment to reduce injury during a dragged landing.

2. Balloon air carrier operations do not have the same degree of regulatory oversight as other air carriers. There may not be an equivalent level of safety for balloon air carriers comparable to that of commercial operators.

3. Exemplar fuel supply hoses manufactured by Sundance Balloons International, one of which was used to connect the inflator tank, did not meet the required airworthiness standard.

4. The company operations manual maximum wind speed of 15 kt was more than twice the wind speed demonstrated in certification testing. This was too high to ensure a short drag distance while deflating the envelope after landing.

Safety action taken
On March 27, 2008, the TSB released two recommendations to Transport Canada as follows:

While some commercial balloon operators in Canada have fare-paying passenger loads equal to those of

commuter and air taxi operators, their passengers are not assured of the same level of safety and oversight by regulations and standards. The Board is concerned that, without adequate standards and regulations for balloon operators, balloon passenger safety will be compromised. Therefore, the Board recommends that:

> The Department of Transport ensure that passenger-carrying commercial balloon operations provide a level of safety equivalent to that established for other aircraft of equal passenger-carrying capacity. (TSB A08-01)

> **Transport Canada Response to A08-01**
> To address the subject of the level of equivalent safety of passenger-carrying commercial balloon operations, Transport Canada is conducting a risk assessment of commercial passenger-carrying balloon operations. This study will address the special flight operations certificate process and commercial passenger-carrying balloon operation oversight. Once the review is complete, should regulatory changes be required, Notices of Proposed Amendment (NPA) will be developed and submitted to the Canadian Aviation Regulation Advisory Council (CARAC) for consultation.

While some commercial balloon operators in Canada have fare-paying passenger loads in the range of those of commuter and air taxi operators, their passengers are not assured of the same level of safety and oversight by regulations and standards. The inability to quickly shut off the fuel supply during landing or in an emergency increases the risk of a fire and/or explosion, compromising balloon passenger safety. Therefore, the Board recommends that:

> The Department of Transport ensure that balloons carrying fare-paying passengers have an emergency fuel shut-off. (TSB A08-02)

> **Transport Canada Response to A08-02**
> To address the subject of the proposed emergency fuel shut-off for balloons carrying fare-paying passengers, Transport Canada is conducting a risk assessment to determine whether regulatory or non-regulatory solutions would be appropriate to address this issue. Once the review is complete, should regulatory changes be required, NPAs will be developed and submitted to CARAC for consultation.

TSB Final Report A07P0345—Loss of Control—Collision with Terrain

On October 13, 2007, a Cessna 172M floatplane was on a VFR flight from Bamfield, B.C., to Lake Cowichan, B.C., with two pilots and one passenger on board. The aircraft took off from the water aerodrome at Bamfield, completed a climbing turn to the right, and proceeded north along the Trevor Channel at the south end of the Alberni Inlet. An emergency locator transmitter (ELT) signal was later received from an aircraft in the area and the operator reported the aircraft overdue at about 15:50 Pacific Daylight Time (PDT). A search and rescue effort was commenced and the wreckage was located approximately 15 NM northeast of Bamfield. The accident occurred at about 15:00 PDT. The three occupants suffered fatal injuries. There was no fire.

Other factual information
The accident site was at the bottom of a small valley about 3 NM from Sarita Lake. There were very few trees damaged at the site. The trees very close to the accident site, almost straight above and adjacent to the wreckage, had some damage. The area was examined from a helicopter and no other trees showed damage consistent with an aircraft strike.

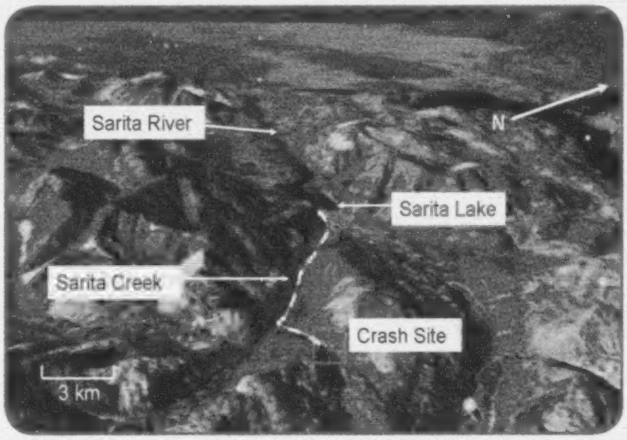


Figure 1: Likely track of aircraft from Sarita Lake

The valley bottom rises gradually between Sarita Lake and the accident site. The accident site is in a smaller valley branching off the Sarita Creek valley, approximately 670 ft above Sarita Lake. This valley rises about 150 ft from the Sarita Creek valley to the accident site (0.5 NM) and a further 300 ft in 0.5 NM beyond the site. The peak elevation of this valley is about 0.75 NM past the accident site. Beyond this point, the terrain drops into another valley. There is an elevation increase of 1 100 ft in the 4 NM between Sarita Lake and the high point in the valley.

Illusions in flight
In some situations, pilots can be subjected to visual illusions when approaching rising terrain. As an aircraft approaches rising terrain, pilots tend to maintain a constant visual angle between the extended cowl of the aircraft and the crest of the terrain ahead. This tendency

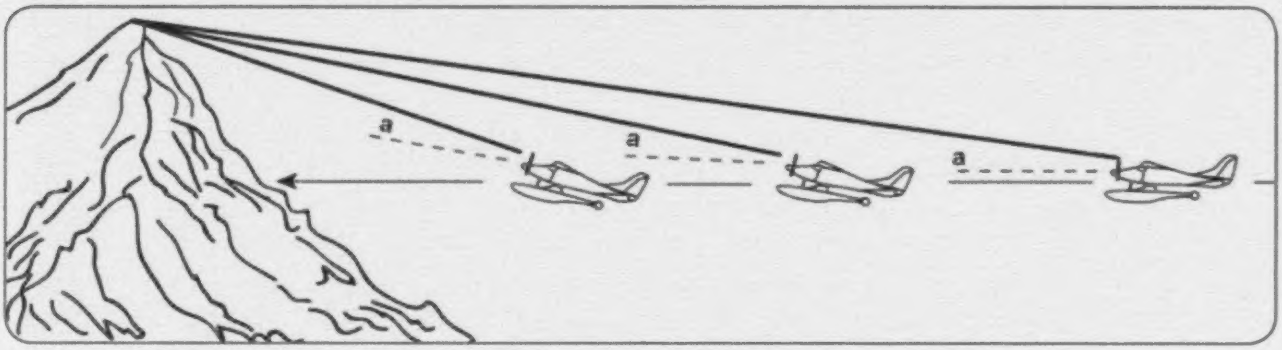


Figure 2: Aircraft performance and terrain profile (angles exaggerated for clarity)

can result in a gradual increase in aircraft pitch attitude and a concurrent decrease in the aircraft's airspeed as the aircraft approaches the elevated terrain (see Figure 2). This often results in a delay to the pilot's realization of inadequate aircraft climb performance ("a" in Figure 2), the aircraft's separation with the terrain decreases and the aircraft gets closer to aerodynamic stall as the angle of attack increases.

Analysis
The wreckage examination revealed no evidence of mechanical control problems. All control surfaces were attached and the physical damage signatures indicated that the aircraft's engine was operating with high power at impact. The weather was not a factor for the proposed flight, so the TSB analysis focused on the operation of the aircraft and human performance.

The attitude of the aircraft at impact is consistent with a stall and spin entry. Because the speed had not increased beyond stall (the slap mark made by the airspeed indicator's pointer at impact was at 40 kt) and there was no damage to the trees around the aircraft at the accident site, it is concluded that the aircraft stalled close to the tree tops. That height was not sufficient to recover from stall before impact with terrain. Also, because the aircraft was found pointed downhill and opposite to the expected route of flight, it is likely that the stall occurred when the pilot was reversing course while flying up the valley at low level. The pilot, or pilots, were applying a right roll aileron control, normally the action to recover from a left roll, but not effective during a stall or spin recovery. In the stall, control was lost.

It could not be determined why the aircraft was so close to terrain in the area of the accident. It is possible they were flying low to look at something on the ground. It is also possible they had made a practice landing and takeoff at Sarita Lake, but they should have been able to climb above terrain on their presumed route, unless optical illusions delayed their realization of the rising terrain and they were operating in a cruise configuration until the last moments of the flight.

When an aircraft stalls close to the ground and recovery is not affected, it impacts the terrain at close to right angles, thereby exposing the aircraft and its occupants to high deceleration forces. If control is maintained, that is to say, the wings are not stalled and the aircraft is flown into gradually rising terrain, the deceleration forces are likely to be spread over a longer time and are more survivable. Because most general aviation aircraft are not equipped with linear stall warning devices such as angle of attack indicators, pilots may not always be aware of how close they are to stalling the aircraft.

In this accident, the horn would not likely have sounded early enough to give either pilot time to take action to avoid the stall.

The non-flying pilot was trained in mountain flying techniques, but for unknown reasons, the aircraft was being flown close to terrain. It is possible that both pilots were lulled into a false sense of security due to visual illusions and the lack of a linear stall warning device. Also, the experience level of the flying pilot may have caused the pilot-in-command (PIC) to be less vigilant.

Finding as to causes and contributing factors
1. The aircraft was operating close to terrain and was reversing course when it stalled and started a spin at an altitude from which there was insufficient height to recover before it collided with terrain.

Findings as to risk
1. Pilots are not always aware of how close to a stall they are, as few general aviation aircraft are equipped with linear stall warning devices, such as angle of attack indicators.

2. There are no regulatory standards for mountain flying training in Canada and pilots continue to delay their decisions to turn around until it is too late to safely do so. △

ACCIDENT SYNOPSES

Note: All reported aviation occurrences are assessed by the Transportation Safety Board of Canada (TSB). Each occurrence is assigned a class, from 1 to 5, which indicates the depth of investigation. A Class 5 consists of data collection pertaining to occurrences that do not meet the criteria of classes 1 through 4, and will be recorded for possible safety analysis, statistical reporting, or archival purposes. The narratives below, which occurred between November 1, 2008, and January 31, 2009, are all "Class 5," and are unlikely to be followed by a TSB Final Report.

— On November 1, 2008, a Bellanca 7ECA airplane was on its first flight since it had been completely overhauled. No discrepancies were noted up to and including the take-off roll. Once airborne, the right wing was observed to lift slightly, and the airplane began to turn to the left. The left wing tip made contact with the runway surface, and the airplane continued turning left until it impacted the ground and came to rest adjacent to a logging road and ditch. It was noted that the airplane appeared to have become airborne at a relatively slow speed and that there were wind gusts on the runway at the time of the accident. The airplane was substantially damaged, and the pilot was seriously injured. *TSB File A08A0145.*

— On November 2, 2008, the pilot of a Norman Aviation International Karatoo was on final approach for a private runway that was not listed in the *Canada Flight Supplement* (CFS). The pilot was blinded by the sun and accidentally descended below the approach slope. At an altitude of approximately 40 ft, the left wing hit a spruce tree and collapsed. The aircraft plummeted to the ground, and the right wing hit a tree and also collapsed. The aircraft crashed in a nose-down attitude. The pilot, who was alone on board, was uninjured. This was the pilot's first landing on this runway, which measured 1 200 ft. *TSB File A08Q0213.*

— On November 8, 2008, a Pilatus PC-12/45 was on approach to Runway 33 at Fort Severn, Ont. The aircraft crossed the threshold at landing reference speed (Vref) 98 kt, and the pilot-flying reduced engine power to idle. As the aircraft was flared for landing, the stall warning/stick pusher system emitted two beeps, and the stick shaker activated, followed immediately by the stick pusher. As the nose of the aircraft pitched down, both crew members overrode the stick pusher, and the aircraft landed in a flat attitude before the stick pusher interrupt button could be depressed. The nose wheel axle casting broke, and the nose wheel separated from the aircraft. The aircraft sustained substantial damage to the nose landing gear and propeller; the crew and passengers escaped injury. *TSB File A08C0228.*

— On November 8, 2008, a Cessna 182K departed Red Deer Regional Airport, Alta. (CYQF) at 22:27 Mountain Standard Time (MST) for the Innisfail, Alta., aerodrome (CEM4). The pilot was alone onboard. Radio contact was lost, and the wreckage was found by a search party early the next morning in a field southeast of the threshold of Runway 34 at CEM4. The pilot sustained fatal injuries. The Transportation Safety Board of Canada (TSB) used GPS data to establish the pre-impact track, altitude, and speed. When it was 0.7 NM southeast of the threshold of Runway 34, the aircraft entered a continuous, constant rate, right-descending turn until ground impact. During the last minute of the flight, the cruise speed reduced from 116 kt to 95 kt, before increasing rapidly to a maximum of 142 kt before impact. The aircraft struck the ground at high speed in a shallow descent, in a right-wing low attitude. No pre-impact malfunctions were found that would have contributed to the accident. The accident occurred during hours of darkness. At the time of the occurrence, dense fog was observed on a farm about 0.7 NM southeast of the accident site and in the town of Innisfail, about 4 NM southeast. There were no official weather observations at CEM4; however, unrestricted ground visibility at the aerodrome was reported at about 22:30 MST. Runway 16/34 has an aircraft radio control of aerodrome lighting (ARCAL) system, and it was reported that the lights had been turned on at the time of the occurrence, possibly by the accident pilot. *TSB File A08W0223.*

— On November 12, 2008, a Beech King Air 100 made an unintentional gear-up landing at Stony Rapids, Sask. Both crew members were uninjured. However, the aircraft sustained substantial damage to the flaps, propellers, and aircraft underside. *TSB File A08C0234.*

— On November 16, 2008, a Jabiru J170-SPC 3300 ultralight was performing circuits at King George Airpark in Surrey, B.C. On the downwind leg for Runway 25, carburetor heat was applied, but selected to "off" when turning base. On short final, at about 190 ft above ground level (AGL) with 1 300 rpm, the engine (Jibaru 3300A) abruptly stopped. The aircraft did not reach the runway, hit trees, and was destroyed. There was no fire. The pilot sustained minor injuries. *TSB File A08P0355.*

— On November 17, 2008, a Murphy Maverick ultralight was landing at Neepawa, Man. According to information provided, the pilot lost directional control in gusty conditions. The aircraft veered off the left side of the runway, and the left main gear collapsed. There were no injuries. *TSB File A08C0235.*

— On November 24, 2008, a Boeing 737-7CT was being pushed back from Toronto Lester B. Pearson International Airport (LBPIA), Terminal 3, Gate C25 when the left-hand winglet contacted the right-hand winglet of another Boeing 737-7CT aircraft that was being marshalled into the adjacent Gate C24. At the time of the incident, each gate was manned by a four-person ground crew that included a lead hand, two wing walkers, and a fourth person for chalking the aircraft and/or disconnecting the tow tractor. All personnel were in their assigned positions when the collision occurred. There were no injuries. The aircraft were removed from service so both winglets could be replaced. *TSB File A08O0324.*

— On November 27, 2008, the pilot of a Piper PA30 had departed Springbank (CYBW) for a local flight over Banff, Rocky Mountain House, and back to Springbank, Alta. After a touch-and-go at Rocky Mountain House, the pilot noticed that his radios seemed to be shutting down and that the aircraft lost all electrical power when he selected his gear down on approach into CYBW. The gear was extended manually with three green, but on touchdown the gear retracted causing substantial damage to the propellers, engines, and belly of the aircraft. The pilot was the sole person on board and was uninjured. *TSB File A08W0235.*

— On November 29, 2008, a Bellanca 17-30 Viking was landing on Runway 20 at Fort St. John, B.C., with a 10–15 kt crosswind from the northwest. On touchdown, the aircraft veered to the right. The pilot overcorrected to the left, then locked the brakes before the aircraft departed the runway surface and into a snowdrift. The left wing, undercarriage, and propeller were damaged. The pilot and two passengers were injured. *TSB File A08W0238.*

— On December 20, 2008, at approximately 19:51 Mountain Standard Time (MST), a Canadian-registered twin-engine Beech 58P airplane was destroyed when it lost control near Stonewall, Colo. and impacted terrain. The private pilot and one passenger sustained fatal injuries. Night visual meteorological conditions (VMC) prevailed, and an IFR flight plan was filed. The cross-country flight originated from the Pueblo, Colo., with Santa Fe, N.M., as the intended destination. Reportedly, the airplane was in cruise flight at 18 000 ft mean sea level (MSL) when it began an "uncontrolled" descent toward an area of rising mountainous terrain. The last known radar position placed the airplane at 12 800 ft MSL and one mile east of Vermejo Peak (13 367 ft MSL). A short time later, a ground fire was reported by a passing airplane in the vicinity of the last known co-ordinates of the accident airplane. The wreckage was located the following day at an elevation of approximately 12 000 ft MSL. The U.S. National Transportation Safety Board (NTSB) is investigating. *TSB File A08F0188.*

— On January 9, 2009, a student pilot was on his third solo circuit on a Cessna 172 when the aircraft bounced and sustained a hard landing. Maintenance inspection revealed firewall damage around the nose gear strut attachment area, requiring major repair. *TSB File A09W0007.*

— On January 15, 2009, a Canadian-registered Cessna TU206G was in cruise near San Salvador City, El Salvador, when its engine (Teledyne Continental TIO-520M; S/N: 291863R) failed. The pilots managed to carry out a forced landing on a public road under construction. The two pilots on board the aircraft sustained no injuries. Preliminary information indicates an engine failure due to an internal part separation. The top of the engine had a large hole (3.5 in. diameter), and the oil escaped and also went on to the windscreen. El Salvador is investigating this occurrence. *TSB File A09F0007.*

— On January 22, 2009, an instructor and student aboard a Cessna 152 were conducting training exercises at the St. Andrews airport, Man. After the completion of two circuits, the instructor called for a planned simulated engine-failure-after-takeoff exercise. Shortly after the initiation of the exercise, the engine stopped, and the crew was forced to land the aircraft in a snow-covered field 1.5 mi. north of the airport. The aircraft nose wheel collapsed on touchdown, and both wing tips were damaged. The instructor and student were uninjured. The engine stoppage was traced to an inadvertent shutoff of the fuel selector during the simulated engine-failure exercise. *TSB File A09C0013.*

— On January 29, 2009, a Cessna 210E had arrived at Fort Nelson, B.C., from Peace River, Alta. The landing was accomplished with the landing gear retracted. The pilot reported a total electrical failure when flaps were selected. This was compounded by other factors, such as the loss of communication, in addition to turbulent crosswinds. The power did come back on at 1 mi. final. No warning horn was heard even after power returned. *TSB File A09W0019.*

— On January 29, 2009, a privately registered Piper Cherokee was on the landing roll in Vulcan, Alta., when a strong crosswind forced the aircraft off the runway into a snowbank. The resulting impact flipped the aircraft over onto its top. There were no injuries to the lone occupant. *TSB File A09W0020.*

— On January 30, 2009, a Cessna 172H landed on Runway 31 at Quesnel, B.C., after a local flight. At the time of landing, a frontal passage was taking place, and the wind was 340° at 20 kt, gusting to 35 kt. While taxiing onto the ramp at the south edge of Taxiway A, the aircraft was overturned by a very strong wind gust. The aircraft was substantially damaged; the two occupants were uninjured. *TSB File A09P0017.* △

REGULATIONS AND YOU

Safety Management Systems—Civil Aviation Non-Compliance Event Review Process

by Jean-François Mathieu, Chief, Aviation Enforcement, Standards, Civil Aviation, Transport Canada

Historically, Civil Aviation has addressed contraventions committed by aviation companies or their staff by conducting an investigation into the event in order to apply some type of punitive measure as a deterrent. With the advent of the safety management system (SMS) regulatory initiative, however, this process is changing.

In order to meet the goals of the *Civil Aviation SMS Enforcement Policy*, Civil Aviation has developed a process for its inspectors to follow when they become aware that a company (enterprise) with an SMS may have committed a contravention of the *Canadian Aviation Regulations* (CARs) or of the *Transportation of Dangerous Goods Regulations* (TDGR). This process is described in Civil Aviation Staff Instruction SUR-006: *Safety Management Systems—Civil Aviation Non-Compliance Event Review Process* www.tc.gc.ca/CivilAviation/IMSdoc/IMSDocuments/SUR/SUR-006.htm).

With the publication of this process, the Civil Aviation manager responsible for oversight and certification of an enterprise (enterprise manager) is directed to open a documented dialogue with the enterprise when apprised that a contravention may have been committed. The dialogue is intended to verify that the enterprise's SMS can, and will, appropriately address the circumstances that led to the contravention.

In order to accomplish this, the enterprise manager shall:

- verify that the event was reported internally within the enterprise's internal reporting program;
- evaluate whether or not the contravention was committed intentionally (more on this later);
- inform the enterprise that corrective measures that are intended to address the event are to be developed within a specified period (90 days typically).

Once the enterprise manager is satisfied that the organization's SMS has appropriately addressed the event, no further action will be taken against the enterprise. In order to support and promote the use of this SMS-oriented review process, the Aviation Enforcement Division will not conduct its own investigation and will not impose punitive measures (typically, a monetary penalty or temporary document suspension) against either the person who committed the contravention or the enterprise itself. Aviation Enforcement will open an investigation only if the enterprise manager is not satisfied that the goals of the *Civil Aviation SMS Enforcement Policy* are being met.

If the enterprise manager determines that the event was not internally reported (without justification), or is not satisfied by the proposed corrective measures, the manager may forward the matter to Aviation Enforcement for its action, which may include the imposition of punitive measures. Alternately, if the enterprise manager is not entirely satisfied with the proposed corrective measures, the manager may seek revised or enhanced proposals from the enterprise as long as such a course of action is likely to result in an acceptable resolution.

As indicated earlier, the enterprise manager will evaluate the nature of the contravention to determine if it was committed intentionally. The Staff Instruction also provides some guidelines to determine if intent was involved. Of course, intent is a complicated subject, and as a result, the enterprise manager is afforded some latitude in making this evaluation. When the enterprise manager determines that the contravention was likely committed with intent, the manager will forward the matter to Aviation Enforcement—the *Civil Aviation SMS Enforcement Policy* does not apply to intentional contraventions. If unsure about the intent, the enterprise manager is counselled to remain within the process in order to seek an SMS-generated resolution that would best serve the goals of improving safety and compliance. In addition, where the employee has committed the contravention with intent, but the enterprise does not support the behaviour that led to the contravention, the enterprise manager is directed to remain within the SMS event-review process. It is recognized that pursuing an individual for a single contravention will not necessarily address any cultural or organizational issues that may have played a role in the contravention. By approaching such an event from an SMS-oriented perspective, Civil Aviation will be more likely to effect the necessary cultural and organizational changes required for overall improvement in safety and compliance. For these reasons, the enterprise manager shall, other than in extreme circumstances that fall outside the scope of the

enterprise's control, evaluate the intent of the organization rather than the intent of the individual who committed the contravention. As indicated above, the purpose of evaluating intent is solely to determine if the process should be used.

Transitional enterprises

To encourage organizations that are not yet required to have an SMS to adopt the SMS framework and to accommodate enterprises that are developing their SMS as new regulations regarding SMS requirements come into force, Civil Aviation has adopted a policy whereby the Staff Instruction shall apply to a transitional enterprise. The *Civil Aviation SMS Enforcement Policy* has defined transitional enterprises as those that "have been diligently involved in the development of an SMS, which would eventually meet the requirements of the new SMS regulations, and are following a 'phase-in' process similar to the one outlined in TC-published advisory material such as TP 14343—*Implementation Procedures Guide for Air Operators and Approved Maintenance Organizations.*" To benefit from this process, the enterprise's SMS must have developed to the stage where the following conditions are met:

i. the enterprise has developed an effective internal reporting program supported and promoted by the company's management;
ii. the enterprise's SMS is capable of a reactive event-analysis process adequate for determining root cause and developing corrective measures;
iii. in order to meet the needs of the process, the corrective measures are made readily available to the Civil Aviation enterprise manager for the manager's review and acceptance.

Conclusion

It is a goal of the SMS initiative that aviation enterprises take ownership of their own safety and compliance issues. In order to support this concept, this event-review process accepts that if an enterprise recognizes and corrects its own safety and compliance issues through the implementation of SMS programs, traditional enforcement should not be necessary.

Transport Canada will not compromise safety nor ignore any contraventions of the regulations, but will encourage the development of a safety culture as an essential element of the SMS framework. △

Exemption from Pre-Publication

by Pierre-Laurent Samson, Civil Aviation Safety Inspector, Regulatory Affairs, Policy and Regulatory Services, Civil Aviation, Transport Canada

The new version of the Triage Statement, which includes the various levels of impact that may be assigned to a proposed regulatory amendment, was outlined in the "Regulations and You" section of *Aviation Safety Letter* (ASL) 2/2009. This article will describe the criteria for publishing a proposed regulatory amendment directly in the *Canada Gazette*, Part II, and will discuss a few files that Civil Aviation will soon be presenting to the Treasury Board Secretariat (TBS).

Most of the regulatory amendments processed by Transport Canada Civil Aviation's Regulatory Affairs Division have a "low" level of impact, as defined in the Triage Questionnaire. The purpose of these amendments is to clarify existing provisions, bring Canadian regulations in line with those in the Untied States or Europe, respond to a request made by the Standing Joint Committee for the Scrutiny of Regulations, or correct one of the following errors:

- minor errors in format, syntax, spelling or punctuation;
- typographical errors, archaisms, anomalies, numbering errors;
- inconsistencies between the English and French versions;
- unclear, nonessential information;
- obsolete regulations, that is, regulations that are outdated but still legally enforceable;
- spent regulations that have no further application or effect.

A low level of impact implies that the amendment will cause little or no controversy and that it is supported by the main stakeholder groups. The TBS believes that, in such cases, pre-publication in the *Canada Gazette*, Part I, adds little to the regulatory amendment process. The TBS analyst who is assigned to the department decides whether or not to grant an exemption from pre-publication for a regulatory amendment after the department has demonstrated that the impact of the proposed amendment is nil or low, that the stakeholders have already been consulted, and that the majority would support the regulatory proposal. The time and resources that would otherwise have been used for the analysis would therefore be dedicated to the analysis of files with higher levels of impact, which require more work.

Since the implementation of the triage process, only two files have been granted an exemption from pre-publication and published directly in the *Canada Gazette*, Part II, after an assessment confirmed a low level of impact. The files involved amendments regarding the International Civil Aviation Organization's (ICAO) language requirements and those regarding monetary penalties. If more than two years have passed since stakeholder consultation was conducted on a proposed amendment, the TBS asks that the department requesting the exemption from pre-publication inform the stakeholders that it intends to proceed with the file.

Civil Aviation currently has about 50 files involving proposed amendments to the *Canadian Aviation Regulations* (CARs). The following are examples of a few files, which are at different stages in the regulatory process.

Amendments are proposed to Part I—*General Provisions* regarding the maximum monetary penalty that may be imposed on individuals or corporations for violations. The amendments would introduce 18 new provisions, repeal three that will no longer result in violations, and make corrections to two. The TBS approved the request for an exemption from pre-publication.

Amendments are proposed to Part III—*Aerodromes, Airports and Heliports* regarding certified water aerodromes. The purpose of these amendments is to increase the safety of certified water aerodromes to a level equal to the current level of safety found at certified land airports. The following water aerodromes would be affected: Victoria Harbour, Vancouver Harbour, Vancouver International, Nanaimo Harbour and Prince Rupert/Seal in British Columbia; and Québec/Lac St-Augustin, Montréal/Boisvert & Fils, Montréal/Marina Venise and Delco Aviation in the province of Quebec. The triage statement for these amendments suggests a level of impact that will require pre-publication.

Amendments are proposed to Part IV—*Personnel Licensing and Training* regarding the conduct of flight tests. The purpose of these amendments is to move the flight test rules of conduct from the policies where they are now to a new subpart of Part IV. The TBS approved the request for an exemption from pre-publication.

Amendments are proposed to Part V—*Airworthiness* regarding safety management systems (SMS). The purpose of these amendments is to clarify the existing SMS requirements, have them apply to all certificate holders under this Part, and require the implementation of a fatigue risk management system in the aviation maintenance environment. The triage statement for these amendments suggests a level of impact that will require pre-publication.

Amendments are proposed to Part VI—*General Operating and Flight Rules* regarding means of emergency location (e.g. emergency locator transmitters [ELT] capable of broadcasting on frequency 406 MHz, or any alternate means of emergency location that meet the performance criteria for a 406 MHz ELT). The purpose of these amendments is to continue to ensure rapid emergency response to distress situations once the Cospas-Sarsat satellite system stops responding to distress signals broadcast on 121.5/243 MHz. These amendments have already been pre-published and are proposed for publication in the *Canada Gazette*, Part II.

Amendments are proposed to Part VII—*Commercial Air Services* regarding the terrain awareness and warning system (TAWS) for aircraft operating under subparts 703, 704 and 705 and flying in accordance with instrument flight rules (IFR). The purpose of these amendments is to reduce the risk of controlled flight into terrain (CFIT). The triage statement for these amendments suggests a level of impact that will require pre-publication.

The CARs amendments that Transport Canada has presented to the *Canada Gazette*, Parts I and II, can be found on the following Web site: www.tc.gc.ca/civilaviation/RegServ/Affairs/carac/NPAs/menu.htm. △

Reminder to holders of Canadian air traffic controller licences and flight crew licences and permits

If you have not already applied for your new Aviation Document Booklet to replace your existing licensing documents, please go to our Web site to download the application form: www.tc.gc.ca/civilaviation/general/personnel/changes.htm.

If you do not have access to the Internet, mail in your request for an application form at:
Transport Canada, Flight Crew Licensing (AARTL)
Place de Ville, Tower C, Ottawa, ON, Canada K1A 0N5

Farewell to Lorna deBlicquy

Pioneering aviator Lorna deBlicquy died peacefully at age 77 on Saturday, March 21, 2009.

Her daughter, Elaine deBlicquy, reported that "she had been doing quite well recently and was reading, as she usually did, voraciously. She had dinner...and sat down in a chair overlooking Lake Simcoe where she just 'went to sleep'."

Lorna deBlicquy spent her life flying and fighting for women's rights, particularly in the field of aviation. She learned to fly at the Atlas Aviation Flying School in Ottawa, Ont., and soloed a J-3 Cub at age 15. She became Canada's first woman parachutist a year later and, at the same time, the youngest person to parachute jump.

She found flying jobs hard to come by in the 1950s in Canada as most employers would not hire "girl pilots," but through perseverance she instructed flying, did bush flying, and became a glider and helicopter pilot. She also flew DC-3s and Twin Otters, including for famine relief in Ethiopia in 1986.

Lorna became very well known in Canada for her outspoken approach to gender equality in aviation, writing many letters, and being interviewed for newspapers and on radio. In 1977, Transport Canada hired her and she became Canada's first female civil aviation inspector, commuting to Toronto, Ont., every week from her home in Ottawa. After two years, she worked freelance in various departments of Transport Canada under contract throughout Eastern Ontario. Lorna was an honorary life member of both the Ninety-Nines and the Ottawa Flying Club. She was also a member of the women's helicopter association (The Whirly Girls) and the Canadian Owners and Pilots Association (COPA). She served on many advisory committees, including those of the Canada Aviation Museum, Algonquin College and the Air Transport Association of Canada (ATAC).

Lorna won many awards and tokens of recognition for her work, including a Ninety-Nines Amelia Earhart Scholarship, Outstanding Contribution to the Science and Technology Museums, Ninety-Nines Award of Merit, The Trans-Canada (McKee) Trophy, an FAI (Fédération Aéronautique Internationale) Diploma, the Order of Ontario, the Order of Canada, and the Governor General's Award in Commemoration of the Persons Case, for women who fought for equality. She was also inducted into the International Women in Aviation Pioneer Hall of Fame.

Lorna deBlicquy addressed a joint meeting of COPA Flight 8, the Eastern Canada Chapter of the Ninety-Nines, EAA Chapter 245, and several other associations at the Canada Aviation Museum on March 22, 2006, a talk that will be remembered for a long time by those in attendance. An account of the presentation written by Ruth Merkis-Hunt is available on COPA Flight 8's Recent Events Web site (web.ncf.ca/fn352/flight8/recent.html).

Lorna deBlicquy was a trailblazer, one of Canada's best-known women pilots and one of the most experienced. She overcame many barriers and was tireless in her efforts to advance the cause for women in Canadian aviation. After a long and colourful career, Lorna retired from full-time flying in October 1999. As local pilot Bob Berthelet aptly put it, "I know she will be missed by us all."

This article is based on the COPA Flight 8 tribute, found at web.ncf.ca/fn352/flight8/, *which was itself based on the story of Lorna deBlicquy on the Ninety-Nines' Web page at* www.canadian99s.org/articles/P_deblicquy.htm. *—Ed.* △

Transport Canada is pleased to announce the appointment of Mr. Martin Eley to the position of Director General, Civil Aviation, effective May 4, 2009.

TP 2797E

VFR FLIGHT INTO ADVERSE WEATHER CAN BE DEADLY

It's better to arrive a little late in this world, than early in the next!

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TAKE FIVE...

for safety

Five minutes reading could save a life

Complacency

Of the many threats to a successful safety program, one of the most common and persistent is complacency. Complacency in itself is a deceiving and unwarranted satisfaction with a given level of proficiency, which leads to stagnation and unknowing deterioration of proficiency. It is of primary concern to any organization and a major problem area requiring constant supervisory surveillance. When it develops among pilots or maintenance personnel, it inevitably results in mishaps, both in the air and on the ground.

Recognizing the onset of complacency is not a difficult task. Signs develop as supervisory controls are relaxed and objectives become vague. There is an observable lack of dedication and enthusiasm to the job, and the routine prescribed standards of performance and care are disregarded. For example, pilots in a routine environment, lulled by their level of experience and proficiency, may rationalize that detailed flight planning is unnecessary. Briefings become sketchy or nonexistent as the pilots assume that crew members understand what is expected of them, or what their responsibilities and assignments are. This attitude will be reflected throughout the entire flight, resulting in inefficient utilization of flight time, which may terminate in an incident, accident, or injury. Similar analogies can be made for the maintenance department personnel who would soon reflect the effect of a complacent attitude through mismanagement of men and material assets. The results are the same: a disregard for the normal standards of quality workmanship, a lack of commitment, and an increase in accident potential.

The old cliché "an ounce of prevention is worth a pound of cure" is certainly applicable in this case. Combating complacency once it has developed is extremely difficult. Preventing its development is obviously the simplest and desired approach to the problem. In either case, prevention or correction, the measures to be taken are basically the same. Supervisors must establish the required standards of performance and quality production that become well known and understood. Following this, the supervisor must assure that the established standards are maintained through the exercise of reasonable discipline and firm leadership. Supervisors must delineate the objective requirements and provide their personnel with the means by which ultimate achievement can be accomplished. Pilots, mechanics, and clerks provided with challenging and attainable goals along with the knowledge and incentive required to achieve these objectives will not be complacent.

Commanding Officer
MAG-56

This article appeared in the July 1971 and May/June 2008 issues of Approach *magazine, the U.S. Navy and Marine Corps aviation safety magazine. Reprinted with permission.*

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